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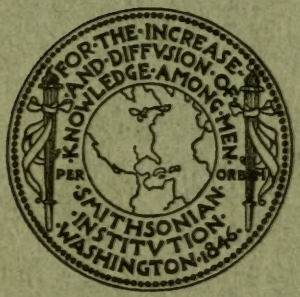
RIVER BASIN SURVEYS PAPERS

Inter-Agency Archeological Salvage Program

No. 7.—ARCHEOLOGICAL INVESTIGATIONS IN THE OAHE DAM AREA, SOUTH DAKOTA, 1950–51, by DONALD J. LEHMER



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PUBLISHER'S NOTE

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No. 2. Prehistory and the Missouri Valley Development Program: Summary Report on the Missouri River Basin Archeological Survey in 1949, by Waldo R. Wedel. Bull. 154, pp. 61–101, pls. 13–15. 1953.

No. 3. The Woodruff Ossuary, a Prehistoric Burial Site in Phillips County, Kansas, by Marvin F. Kivett. Bull. 154, pp. 103–141, pls. 16–28, figs. 2–3. 1953.

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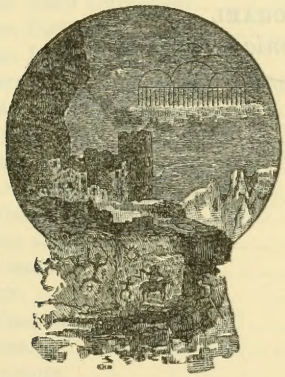

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LETTER OF TRANSMITTAL

SMITHSONIAN INSTITUTION,
BUREAU OF AMERICAN ETHNOLOGY,
Washington, D. C., November 10, 1953.

SIR: I have the honor to submit the accompanying manuscript, entitled "Archeological Investigations in the Oahe Dam Area, South Dakota, 1950–51," by Donald J. Lehmer, which is to be Number 7 of the River Basin Surveys Papers, and to recommend that it be published as a bulletin of the Bureau of American Ethnology.

Very respectfully yours,

M. W. STIRLING,
Director.

DR. LEONARD CARMICHAEL,
Secretary, Smithsonian Institution.

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PREFACE

The accompanying report on Archeological Investigations in the Oahe Dam Area, S. Dak., is Paper No. 7 in the River Basin Surveys Papers and constitutes the second Bureau of American Ethnology Bulletin to be devoted to results of the Inter-Agency Archeological Salvage Program. It is the first detailed, technical report to be issued covering a completed series of excavations carried on by the Missouri Basin Project of the River Basin Surveys of the Smithsonian Institution. The area where the digging was done is an important one in the aboriginal history of the Missouri Basin, and while some previous work had been carried on there, nothing as extensive as the investigations of the Dodd and Phillips Ranch sites had been attempted. The results unquestionably contribute much needed knowledge on several aspects of Indian life in that portion of the Plains and make possible the outlining of a number of cultural developments. They also provide the framework for a relative chronology for some of the remains found there.

The Dodd site, situated on the west side of the Missouri River about half a mile upstream from the Oahe Dam, proved a considerable surprise, for it was found to contain evidence of three different occupations instead of the single one anticipated from surface indications. Originally it was planned to spend a short time in sampling the site, but when its true character became apparent the plans were changed to provide for more extensive excavation, and most of one season and part of another were devoted to it. The site was located for the most part on the line of the approach channel that is to carry water from the reservoir to the discharge tunnels in the dam. Thus the archeological work was truly a salvage operation. The excavating party was put to it to keep ahead of the bulldozers and other large earth-moving machinery, and by the end of the first season most of the site had disappeared. One small segment still remained the following spring, and it was investigated before being obliterated by construction activities.

The Phillips Ranch site, also on the west side of the river, was about 1 mile downstream from the Dodd site. It lay in the construction area and was liable to damage at any time. To protect it until the necessary excavations could be made, the Corps of Engineers erected a fence around it and gave instructions that no heavy equipment

was to be moved across the area until the archeological work was completed. This cooperation was helpful and was greatly appreciated. The remains at the Phillips Ranch were those of a fortified village with only a single occupation. Evidence obtained from it indicates that it followed immediately after the third and final occupation at the Dodd site. Both sites contained some trade objects of European manufacture, but they were more numerous at Phillips Ranch and in addition the latter contained some horse bones. The trade objects suggest that the last occupation at Dodd was in the early part of the eighteenth century, while that at Phillips was during the latter half of the century. There is nothing to provide dates for the two earlier horizons at Dodd, but they are thought to be prior to A. D. 1600.

Starting with the four periods, the positions of three being determined by stratigraphic evidence and the fourth by inference, represented at the Dodd and Phillips sites, Dr. Lehmer makes use of the available information from other sites in the region and offers a synthesis of cultural developments consisting of a six-period sequence. He recognizes, however, that some as yet unexcavated sites may make it necessary to add another stage. It probably would precede the last one at the Dodd site but would be subsequent to the two earlier ones. From the assemblages of traits which are characteristic of the several stages he concludes that there was cultural continuum in the area but that there were periods when there were rather rapid modifications in the local culture. The latter seemingly were caused by influences from other cultural complexes, and to understand them properly they must be considered in the light of the complete aboriginal history of the area. Present knowledge of the Plains, however, is still entirely too meager to warrant hard and fast conclusions. As additional extensive excavations are made and more and more of the details of the picture become apparent there undoubtedly will be changes in present concepts and hypotheses. Dr. Lehmer suggests that there were a number of differing broad cultural traditions which waxed and waned from time to time and place to place throughout the Plains and that various local developments occurred within the framework of each. He sketches the main outlines of the broad traditions and indicates which, in his opinion, were the sources of various traits in the several stages of his sequence for the remains in the Oahe Reservoir area. His reconstruction may or may not prove to be the correct one, but in the present stage of Plains archeology it definitely has merit in indicating gaps in the source material and centering attention on places where future investigations should be made.

The results of work in the Oahe area as presented in the report by Dr. Lehmer are gratifying. When it is remembered, however, that 318 sites were located by survey parties, with some districts still not visited, and that 212 were recommended for test trenching to obtain evidence on which to base the selection of a minimum of 60 sites for intensive excavation, the meagerness of the investigations thus far accomplished is quite apparent. There is still much information to be obtained there before an adequately detailed story of aboriginal life in the reservoir basin can be written.

Frank H. H. Roberts, Jr.,
Director, River Basin Surveys.

ARCHEOLOGICAL INVESTIGATIONS IN THE OAHE DAM AREA, SOUTH DAKOTA, 1950–51 [1]

By Donald J. Lehmer

FOREWORD

During the field seasons of 1950 and 1951 the writer was in charge of Missouri Basin Project parties of the River Basin Surveys which worked in the vicinity of the new Oahe Dam near Pierre, S. Dak. They were successful seasons, and a large part of the success was due to the cooperation of a number of individuals.

The various members of the Area Office of the Corps of Engineers gave the party every possible facility, and it is very pleasant to be able to thank Lt. Col. Alfred D. Starbird and L. C. Leavitt, Area Engineers in 1950 and 1951, respectively, for their many courtesies. Pat Feeny, of Pierre, provided the party with very comfortable quarters in the dam area, for which he was blessed during each spell of bad weather and every time a shower was taken at the hot artesian well.

I am sincerely grateful for the help of the local workers and the students who made up both parties. In 1950, John Molloy was in charge of our reconnaissance team; James Deetz made the field drawings; Alice Shroyer supervised the specimen processing; and Donald Hartle, field assistant, cheerfully and competently coped with most of the drudgery of running the excavation. Most of the work in 1951 was done by local labor, and Thomas Cummings and Raymond Price, field assistants, made it possible to carry on a reasonably proper excavation.

Like an army, a field party is dependent on its source of supply, and Paul Cooper, field director of the Missouri Basin Project, deserves every credit for keeping up a steady flow of supplies and equipment.

Like all such reports, this one is the product of the efforts of a number of people. Special materials have been identified by Drs.

[1] Revised manuscript submitted December 1952.

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Theodore E. White (mammal bone), Herbert Friedmann (bird bone), and Joseph P. E. Morrison (shell), of the U. S. National Museum. Dr. Charles Riley of the University of Nebraska, identified the stone materials, and Dr. Glenn A. Black classified the contact items.

In the MBP laboratory in Lincoln, George and Margaret C. Metcalf were both helpful when it came to sorting and measuring the specimen material; Dean Clark kept the specimens readily available in the storage section; Alice F. Rowe and Rose L. Cohen made the artifact drawings; N. L. Dewell made the photographic plates; and Doris J. Winninger patiently and accurately coped with the innumerable changes in the typescript. The report was finished under considerable time pressure, and it would not have been completed without the wholehearted cooperation of LaVerna M. Pendleton, then laboratory supervisor.

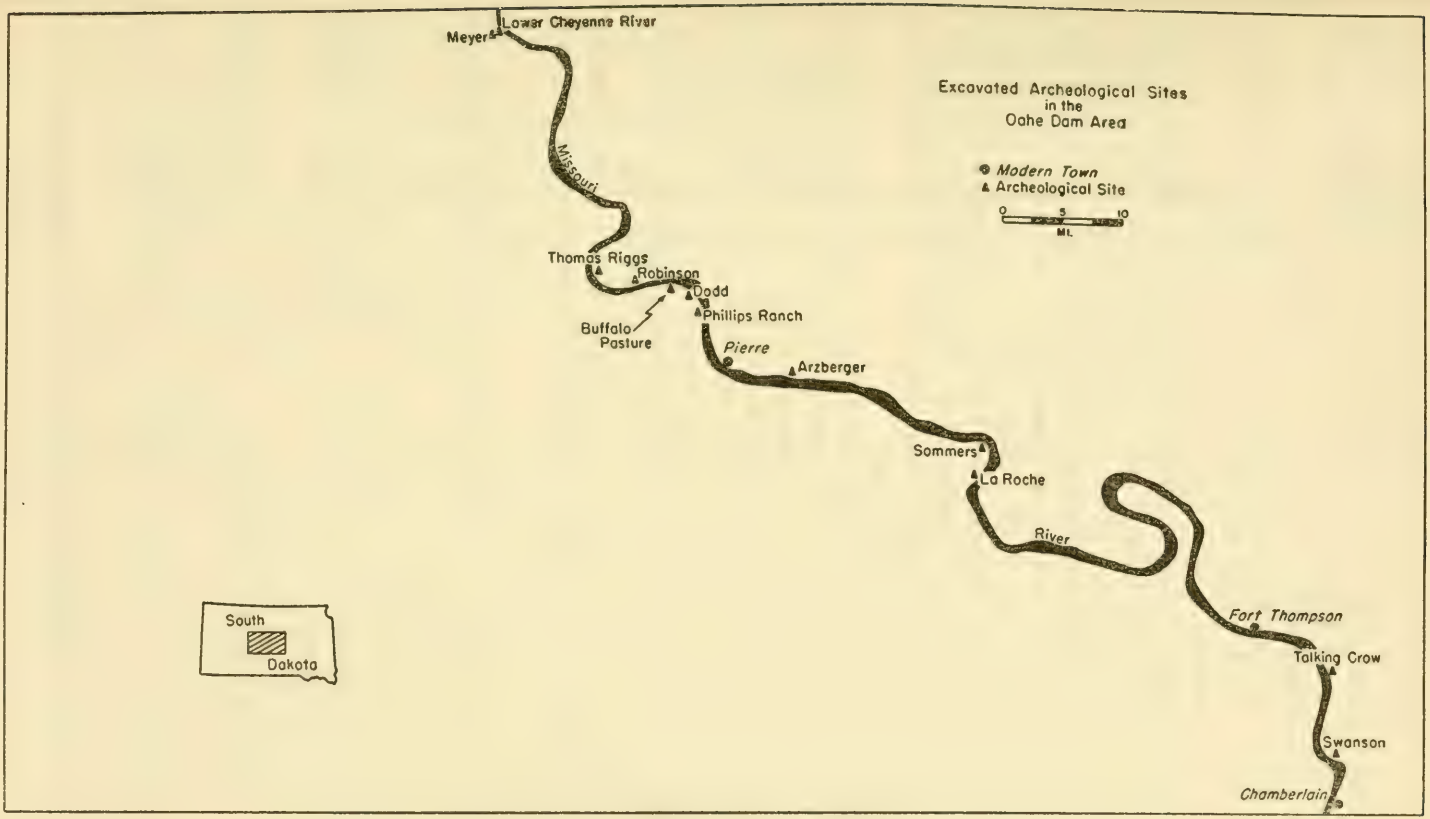
No one can know an archeological area until he has worked in it. The writer took his maiden plunge into Plains archeology in June 1950. In the field he found that the name is the most fundamental difference between an earth lodge and a Mogollon pit house. His conceptual indoctrination was a rapid one, thanks to long conversations with John L. Champe, E. Mott Davis, Wesley R. Hurt, Jr., George Metcalf, and Carlyle S. Smith. Their suggestions, and their tolerance of a newcomer's ideas, are largely responsible for any merits which the final sections of this paper may have.

THE DODD SITE

INTRODUCTION

The Dodd site was named for the late Brig. Gen. George Allen Dodd, pioneer soldier in the Dakota Territory. It was a stratified village located in sec. 30, T. 6 N., R. 31 E., Stanley County, S. Dak. It was situated on the west bank of the Missouri River 6.3 river miles upstream from Pierre, S. Dak. (map 1). It was 0.6 mile upstream from the crest of the new Oahe Dam, and the centerline of the approach channel designed to carry the flow from the reservoir into the discharge tunnels passed through the middle of the north section of the site. Work was begun on the construction of the approach channel in the fall of 1950, and before the Oahe party left the area that year, most of the Dodd site had been hauled away in the contractor's trucks.

The site itself (map 2) was divided into a northern and southern section by a deeply incised intermittent drainage. However, the evidence of several changes in the location of a historic road indicates that the channel-cutting dates from after the White occupation of the area. The southern section of the site, with elevations ranging



Map 1.—Archeological sites in the Oahe area, S. Dak.

from 1,455 to 1,465 feet, was located on a stretch of level ground between the foot of a fairly steep hill and the river bank. The north section of the site lay along the crest of a gently sloping ridge which had a northeast-southwest axis. The elevations of the area of occupation on the ridge ranged from 1,465 to 1,480 feet.

Prior to excavation, both sections of the site were covered with a heavy sod which sealed in almost all of the cultural debris. The surface indications consisted of a series of depressions of various shapes and sizes, generally distinguished by a more luxuriant grass cover. The most prominent ones were circular and ranged from 20 to 60 feet in diameter. These marked the location of earth lodges. A series of smaller depressions generally represented cache pits, but in several cases a supposed cache pit proved to be a full-sized earth lodge. In the north section, there were two long shallow depressions crossing the neck of the point at the end away from the river. From the ground surface both of these appeared to be fortification ditches. Subsequent excavation showed that one actually was a ditch; the other was an old road.

The normal stratigraphic section within the occupation area consisted of a layer of sod and the attendant root zone which extended to a depth of about 0.5 foot. This zone was almost sterile. Below it was a layer of fine silt, dark-colored and heavily charged with the debris which had accumulated during the occupation of the site. The refuse-bearing stratum ranged from 0.5 to 2.5 feet in thickness. Below the refuse mantle there was a sterile native soil—a tan wind-laid silt, with a fairly well-developed humus zone at the top. Pits which had been dug in the native soil and refilled with the refuse-bearing formation were easily distinguishable both by the difference in color and a more porous texture.

Before excavation was begun, the site was laid off with a control grid of 50-foot squares. Features which were apparent on the ground surface were numbered and marked with builder's lath set at the center of the depression. From time to time some confusion arose regarding stakes owing to the fact that the Dodd site was one of the most surveyed sections in South Dakota. In addition to the work done by the Smithsonian party, the site had been twice surveyed by the Corps of Engineers and once by the contractor's men.

During the work at the site, a series of test pits were dug in various parts of the occupation area. They were designed to test for features not apparent from the surface. Another series of test pits was put down outside the fortification ditch in the hope of locating burials. Several test trenches were also dug to cross-section the fortification ditch and to investigate other areas of the site.

In excavating the houses, a preliminary test was made more or less

Map 2.—The Dodd site (39ST30)

at the center of the depression marking the house pit. As soon as the house floor was defined in the bottom of the test pit, one wall of the pit was cut back into an exploratory trench to locate the edge of the house pit. The house floor and the lower part of the pit wall were easily recognizable by the contrast between the dark, loose-textured pit fill and the light-colored compact native soil. Once the pit wall had been located, a trench was dug around the entire perimeter of the house. When the house pit had been outlined, the fill was shoveled out to within 0.3 foot of the floor. The remainder of the fill was troweled off the floor, and the material in it was sacked separately from that in the upper part of the fill. After the floor had been cleared, the various features such as post holes, firepit, etc., were cleaned. The entryways were, as a rule, rather poorly defined, and we found that they could best be located in cross section in the wall of the house pit with reference to various internal features of the house itself. After the house floor had been cleared and the entrance excavated, we usually stripped down to the top of the native soil around the edge of the house pit in order to locate any features outside the pit itself. We found none associated with any of the houses which we stripped.

In houses with pits so shallow that they did not cut into the native soil, the limits of the excavation were carried well beyond the outermost post holes. This technique left the house outlined in the floor of the excavation by the post holes which had contained the wall members.

Cache pits in the house floors were generally small, and were excavated by simply removing the fill from the pit. Caches which were found outside the houses were dug by bisecting them with a short trench which cut away approximately half of the pit and extended to within about 0.5 foot of the pit floor. This left a half section of the pit exposed in the trench wall. In most cases it was impossible to define the neck of the pit where it passed through the refuse mantle.

Most of the houses were quite close together. That, together with a number of cases of superposition, created a definite problem in the disposal of the back dirt. Several times during the season we arranged with the subcontractors on the dam construction for the use of a 12-yard carryall drawn by a D–8 Caterpillar tractor. We used this equipment to pick up the back dirt piled at the edges of the excavations and to haul it outside the area in which we were working. From time to time we also used the same equipment to strip the sod off areas which we planned to dig. At the very end of the season we used a bulldozer to remove the bulk of the fill from one of the rectangular houses. Before the machine was put to work, we shoveled out tests to locate the floor and the walls of the pit. The operator used these

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as guides, and proceeded to scoop up most of the pit fill and pile it outside one end of the house pit.

Since this project, like all River Basin archeology, was a salvage program we sacrificed overmeticulousness in favor of dirt moving. Troweling was held at a minimum compatible with accurate excavation. We seldom screened any of the dirt from the excavations. Periodic checks of the back dirt, both by our own party and by our numerous visitors, showed that a minimum of material was being overlooked. The number of houses, cache pits, and other features which we were able to excavate prior to the complete destruction of the Dodd site more than justified the loss of the specimen material which did go out on the shovels.

THE FEATURES

In conformance with standard River Basin Surveys usage, the term "Feature" was applied to anything which we wished to specify within the site. A house, a cache pit, a test trench, etc., were all designated as a "Feature" and distinguished by an arabic numeral. At the beginning of the season the writer was rather dubious about this practice. At the end of the season he was completely converted to it. The use of the single term precluded the confusion which arises when something which was originally called a cache pit develops into a full-sized earth lodge.

THE FORTIFICATION DITCH

The north section of the site, which was located on the gently sloping top of a ridge, was bounded on the north, east, and south by the fairly steep sides of the ridge. There was a fortification ditch at the westernmost limit of the area of occupation. On the surface, the ditch appeared as a shallow trench almost 20 feet wide and 2 feet deep. It ran more or less at right angles to the long axis of the ridge. The greater part of the ditch was straight, but the ends curved slightly toward the river to give a somewhat greater enclosure of the area of occupation. We cross-sectioned the ditch with three 5-foot trenches cut at right angles to the line of the ditch. In the trench walls, the ditch appeared as a U-shaped intrusion of the refuse mantle into the native soil (fig. 1). The mean width of the ditch proper ranged from 5 to 6 feet. The bottom of the ditch was 4.5 to 5 feet below the ground surface at the time of excavation, and 3.5 to 4 feet below the top of the

native soil. The cross trenches were carried well back on either side of the ditch, but we found no evidence of a palisade either inside or outside the ditch.

The south section of the site showed no signs of fortification.

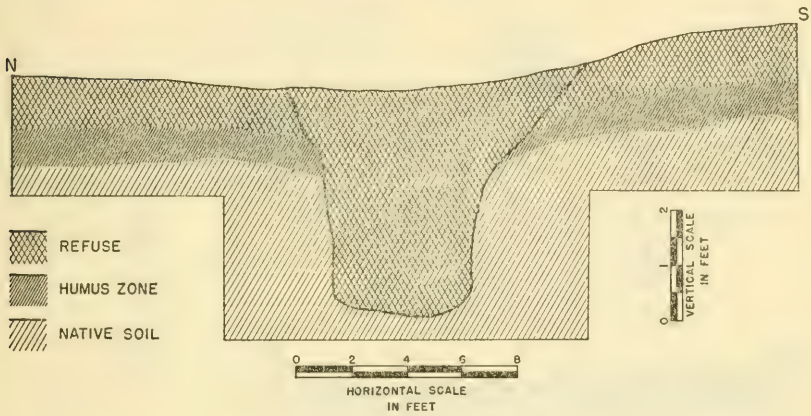

FIGURE 1.—Cross section of the fortification ditch at the Dodd site.

THE HOUSES

We completely excavated 21 houses at the Dodd site, and tested 8 more. The houses themselves fell into two general groups, circular and rectangular.

Feature 1 (fig. 2).

Shape: Circular.

Dimensions: Diameter, 25.5 feet; depth, 2.1 feet.

Pit walls: Unfaced refuse and native soil.

Floor: Tramped bottom of the pit.

Roof supports: Four primary central posts with a scattering of secondary posts, especially through the southwest quadrant of the house. Eleven more or less evenly spaced wall posts near the edge of the floor.

Entrance: Probably almost due east, not defined during excavation.

Firepit: Centrally located basin filled with whitish ash.

Floor pits: One undercut cache pit in the southeast quadrant and one straight-sided cache pit in the southwest quadrant.

Associations: Superimposed over rectangular houses (Features 5 and 29).

Comments: This house had been burned. There were four small waterworn boulders at the base of the east wall of the house. The house floor was the refuse-charged fill of the pits of Features 5 and 29.

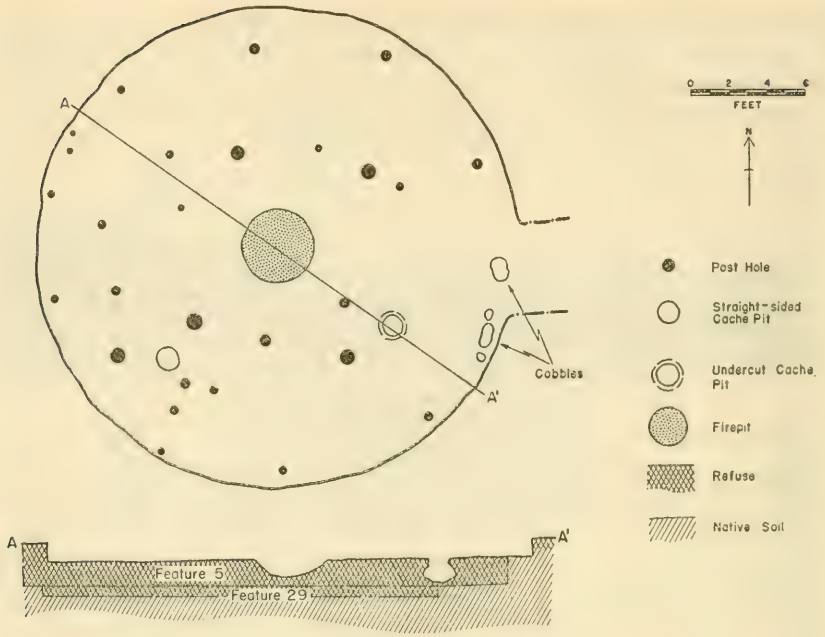

FIGURE 2.—Feature 1, Dodd site.

Feature 7 (fig. 3).

Shape: Circular.

Dimensions: Diameter, 26.9 feet; depth, 1.7½ feet.

Pit walls: Unfaced refuse and native soil.

Floor: Tramped bottom of the pit.

Roof supports: Four primary supports with secondary posts concentrated in the east half of the floor. Holes for only seven wall members were located.

Entrance: Opening to the northeast. The passage curved to the east.

Firepit: Centrally located basin filled with whitish ash.

Floor pits: One large hole in line between the firepit and entrance may have contained a wooden mortar. There was an undercut cache and a cache pocket in the entrance.

Associations: Superimposed over rectangular houses (Features 42 and 88).

Comments: This house had probably been burned.

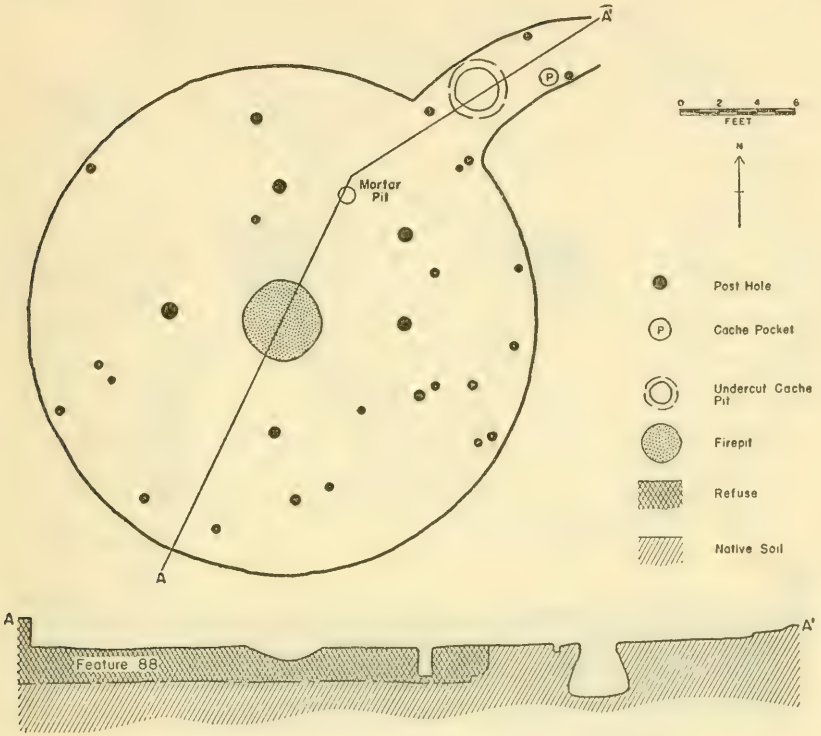

FIGURE 3.—Feature 7, Dodd site.

Feature 8 (fig. 4).

Shape: Circular.

Dimensions: Diameter, 27.0 feet; depth, 2.8 feet.

Pit walls: Unfaced refuse and native soil.

Floor: Tramped bottom of the pit.

Roof supports: Four primary central posts with a scattering of small posts in the south half of house. Closely spaced wall posts were found around most of the perimeter of the floor.

Entrance: Opening to the east. The floor of the entryway contained a number of irregularly spaced post holes.

Firepit: Centrally located basin filled with whitish ash.

Floor pits: One undercut cache pit near the entrance; two straight-sided pits; and two cache pockets.

Associations: Superimposed over rectangular house (Feature 41) and undercut cache (Feature 43).

Comments: This house had been burned. In the northeast quadrant of the floor, at the base of the wall, there was an oval patch of flaked Pierre shale roughly 1.5 by 2.5 feet and 0.2 foot thick. On it were two water-worn cobbles, six large simple-stamped body sherds, a piece of buffalo rib, and a hoe made from the nasal bones of a bison skull.

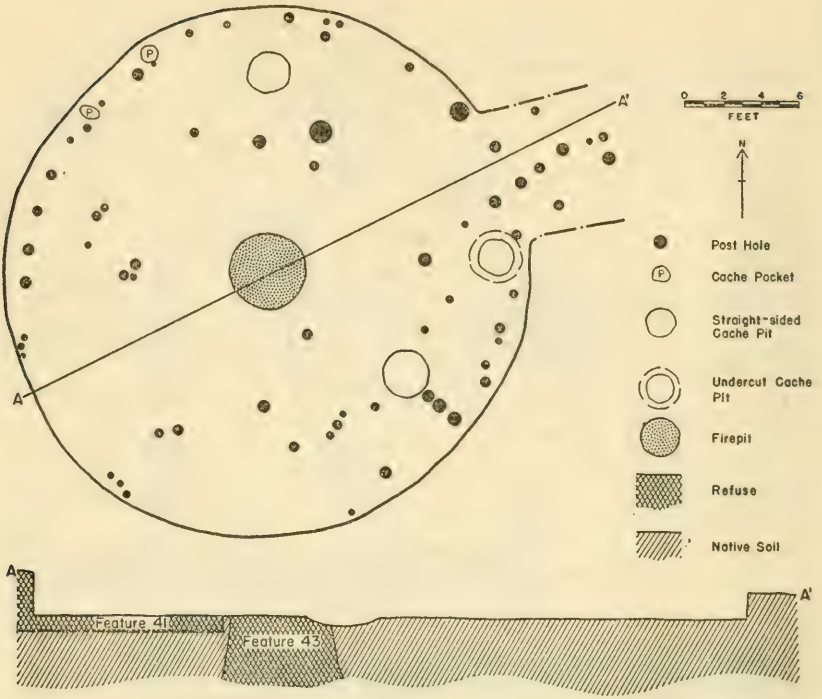

FIGURE 4.—Feature 8, Dodd site.

Feature 11 (fig. 5).

Shape: Circular.

Dimensions: Diameter, 26.8 feet; depth, 2.2 feet.

Pit walls: Unfaced refuse and native soil.

Floor: Tramped bottom of the pit.

Roof supports: Four primary central posts. The primary support in the northwest quadrant of the house was a double post. A series of small post holes following the curve of the house wall some 3 feet in from the foot of the entrance may represent some sort of screen. Wall posts were closely spaced around the perimeter of the floor.

Entrance: This is the only one of the circular houses at the Dodd site in which the entrance opened to the southwest. A careful check was made around the rest of the house wall without finding any other entrance.

Firepit: Centrally located basin filled with whitish ash.

Floor pits: One large cylindrical hole between the firepit and the entrance may have contained a wooden mortar.

Associations: Superimposed over rectangular house (Feature 98) and undercut cache (Feature 96).

Comments: This house had been burned.

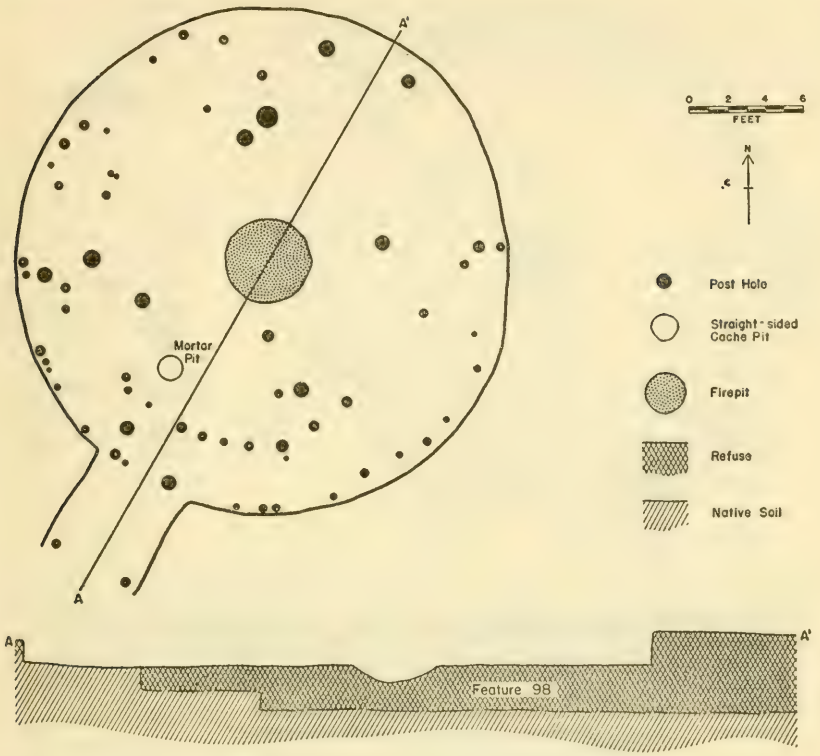

FIGURE 5.—Feature 11, Dodd site.

Feature 15 (fig. 6).

Shape: Circular.

Dimensions: Diameter, 41.7 feet; depth, 2.0 feet.

Pit walls: Unfaced refuse and native soil.

Floor: Tramped bottom of the pit.

Roof supports: Four primary central supports. The perimeter of the floor contained over 300 post holes in a zone at the base of the wall. This zone extended well out into the floor in the area opposite the entrance. Some of these posts may have supported some sort of bench or platform.

Entrance: Opening to the northeast, marked by a well-defined row of post holes on either side of the entryway. There was a definite upslope to the floor of the entrance.

Firepit: Centrally located basin filled with whitish ash.

Floor pits: One large cylindrical hole between the firepit and the entrance may have contained a wooden mortar.

Associations: Superimposed over rectangular house (Feature 76).

Comments: This house had been burned.

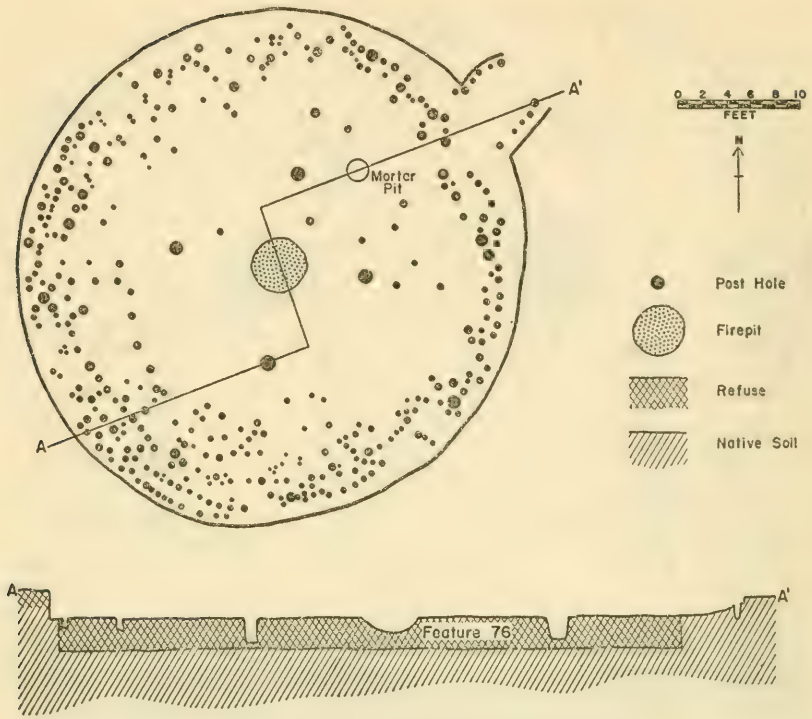

FIGURE 6.—Feature 15, Dodd site.

Feature 35 (fig. 7).

Shape: Circular.

Dimensions: Diameter, 34.0 feet; depth, 1.5 feet.

Pit walls: Unfaced refuse.

Floor: Tramped bottom of the pit.

Roof supports: Four primary central posts and a zone of post holes at the base of the house walls. As in Feature 15, this zone was appreciably wider on the side opposite the entrance. It again may represent the support for some sort of bench or platform as well as the wall members.

Entrance: Opening to the northeast. There were two fairly well-defined rows of post holes along the sides of the entryway.

Firepit: Centrally located basin filled with whitish ash.

Floor pits: None.

Associations: None.

Comments: This was one of the few houses from which it was possible to obtain any information regarding the superstructure. The house had been burned, and there were large amounts of charred wall material lying on the floor. The walls apparently rose directly from the pit floor, not from the lip of the house pit. The wall itself was composed of four separate layers. The inner one was a series of overlapping split wood "bats" roughly 2 inches thick which apparently leaned against the house framework. These vertical members were crossed at right angles

by a series of willow shoots some three-eighths of an inch in diameter. The willow shoots were placed about 3 inches apart. The "bats" and the willow shoots were covered with an inch-thick layer of coarse prairie grass. These three members were presumably blanketed with a layer of earth and sod.

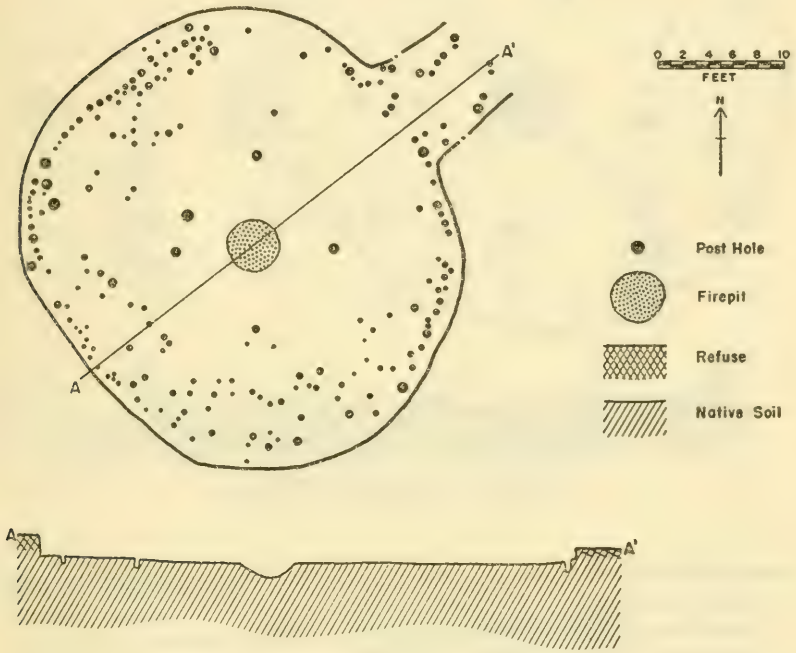

FIGURE 7.—Feature 35, Dodd site.

Feature 73 (fig. 8).

Shape: Circular.

Dimensions: Diameter, 24.0 feet; depth, 2.0 feet.

Pit walls: Unfaced refuse.

Floor: Tramped bottom of the pit.

Roof supports: Four primary central posts and a series of widely spaced posts near the edge of the floor.

Entrance: Opening to the northeast. There was a well-defined row of post holes on either side of the entryway. The entrance floor sloped slightly upward.

Firepit: Centrally located basin filled with whitish ash.

Floor pits: One straight-sided pit just inside the east wall.

Associations: None.

Comments: This house had been burned.

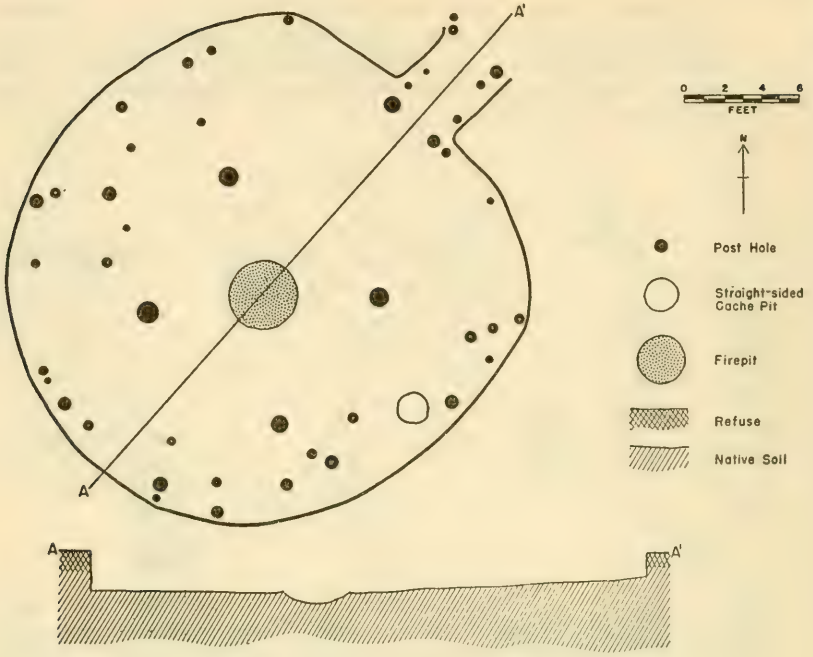

FIGURE 8.—Feature 73, Dodd site.

Feature 106 (fig. 9).

Shape: Circular.

Dimensions: Diameter, 25.0 feet; depth, 1.8 feet.

Pit walls: Unfaced refuse and native soil.

Floor: Tramped bottom of the pit.

Roof supports: Four primary central supports. The one on the southeast corner was a pair of posts. A closely spaced series of wall posts was set in from the edge of the pit.

Entrance: Opening northeast. There were two well-defined rows of posts on either side of the entryway. The floor of the entrance had a slight upward slope.

Firepit: Centrally located basin filled with whitish ash.

Floor pits: An irregular hole just off the line between the firepit and the entrance may have contained a wooden mortar.

Associations: None.

Comments: This house had been burned. This is one of the two houses excavated in the south section of the site.

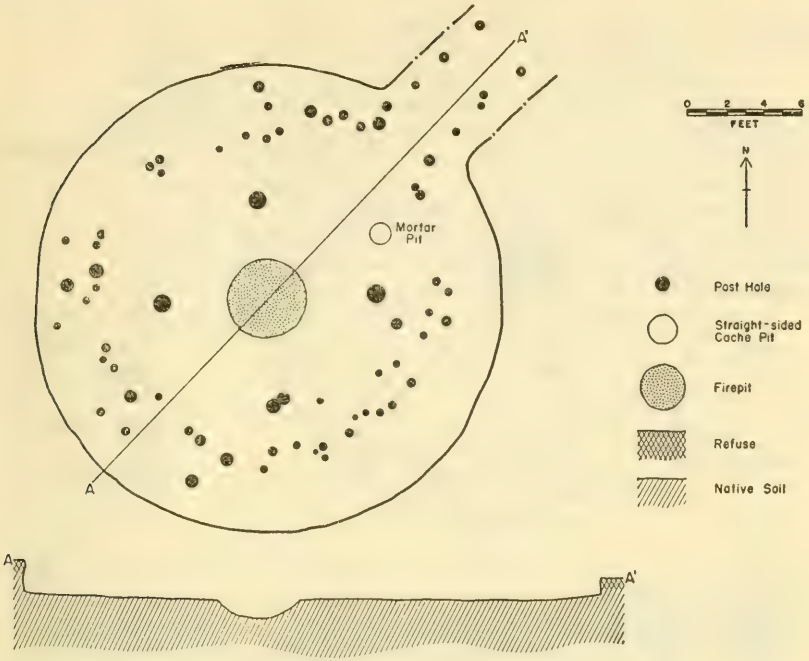

FIGURE 9.—Feature 106, Dodd site.

Feature 107 (fig. 10).

Shape: Circular.

Dimensions: Diameter, 29.0 feet; depth, 2.4 feet.

Pit walls: Unfaced refuse and native soil.

Floor: Tramped bottom of the pit.

Roof supports: Four primary central supports. The smaller posts toward the edges of the floor tend to concentrate into two more or less concentric circles.

Entrance: Opening to the northeast. The entryway was set at an acute angle from the line of a radius of the house pit.

Firepit: There were two partly superimposed basin-shaped firepits at the center of the floor. The smaller one, which was somewhat offset from the center, contained wood ash covered with a layer of packed earth about 0.1 of a foot thick. The larger one had apparently been in use at the time of the destruction of the house.

Floor pits: One undercut cache (Feature 122) just east of the entrance.

Associations: None.

Comments: This house had been burned. This is the second of the two houses excavated in the south section of the site.

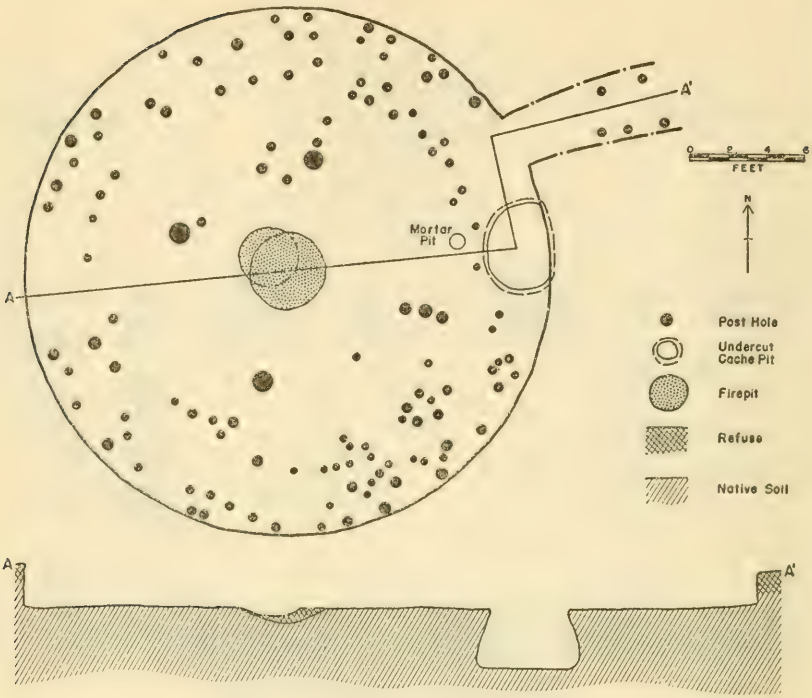

FIGURE 10.—Feature 107, Dodd site.

Feature 25 (fig. 11).

Shape: Octagonal.

Dimensions: Maximum diameter, 59.0 feet; depth, 2.6 feet.

Pit walls: Unfaced refuse.

Floor: Tramped bottom of the pit.

Roof supports: Four primary central supports. The one at the southeast corner of the square was a pair of posts. There were also four large posts set adjacent to the walls, in line with the northern and southern pairs of primary central supports. This arrangement made two rows of four posts each which crossed the entire width of the lodge and probably carried heavy roof members. The wall posts were very evenly spaced, laid out so as to form eight well-defined chords to a circle.

Entrance: Opening to the northeast. The entrance of Feature 25 was longer than in the other circular houses at the site, and the two rows of post holes marking the walls of the entryway were unusually straight and evenly spaced.

Firepit: Centrally located basin filled with whitish ash.

Floor pits: None.

Associations: Superimposed over rectangular houses (Features 77 and 95).

Comments:

Directly opposite the entrance passage there was an earthen "altar" 11 by 6 feet and 1.3 feet thick. The three sides within the house were slightly beveled. No offerings of any kind were found in association with this feature. The large size, the unusual regularity

of the post pattern, and the presence of the altar seem to indicate that this structure had some specialized function, presumably similar to that of the historic Arikara ceremonial lodge.

A combination of the superposition of this structure over two older houses, and the excavation technique gave a badly mixed sherd sample from this feature. The center of the floor was rather hard to recognize, and a certain number of sherds from the fill of the underlying house (Feature 95) were apparently included in the floor material from Feature 25. Since the house pit did not cut into the sterile native soil, the limits of the excavation were carried well beyond the wall posts of Feature 25, thus including material from the fill of Feature 77 in the fill sample from Feature 25.

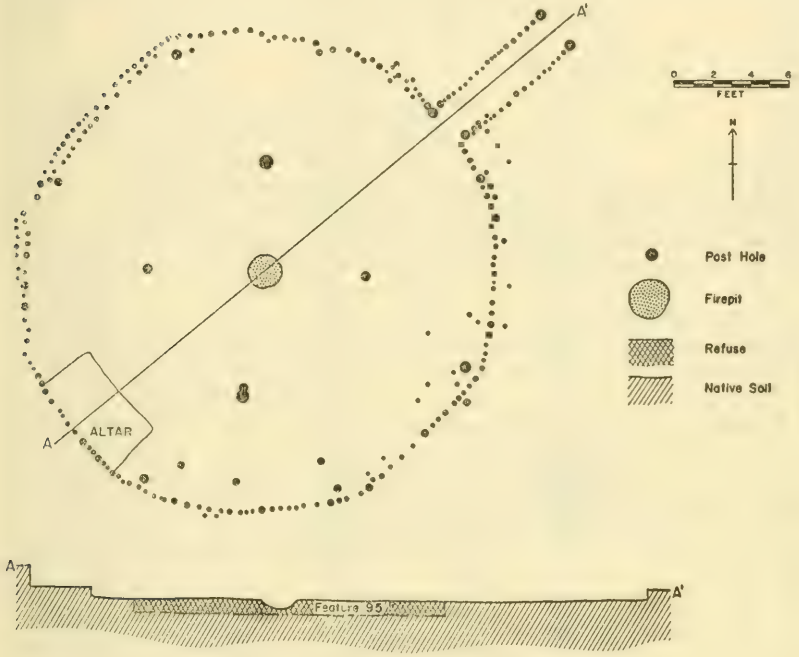

FIGURE 11.—Feature 25, Dodd site.

Feature 17 (fig. 12).

Shape: Rectangular.

Dimensions: 24.0 by 43.0 feet; depth, 3.8 feet.

Pit walls: Unfaced refuse and native soil.

Floor: Tramped bottom of the pit.

Roof supports: There was a concentration of post holes at the base of each of the long walls of the house pit. Post holes were relatively infrequent along the end walls. It seems likely that some of the posts located close to the long axis of the house supported a ridgepole. A concentration of post holes in the vicinity of the entrance may indicate the presence of some sort of screen.

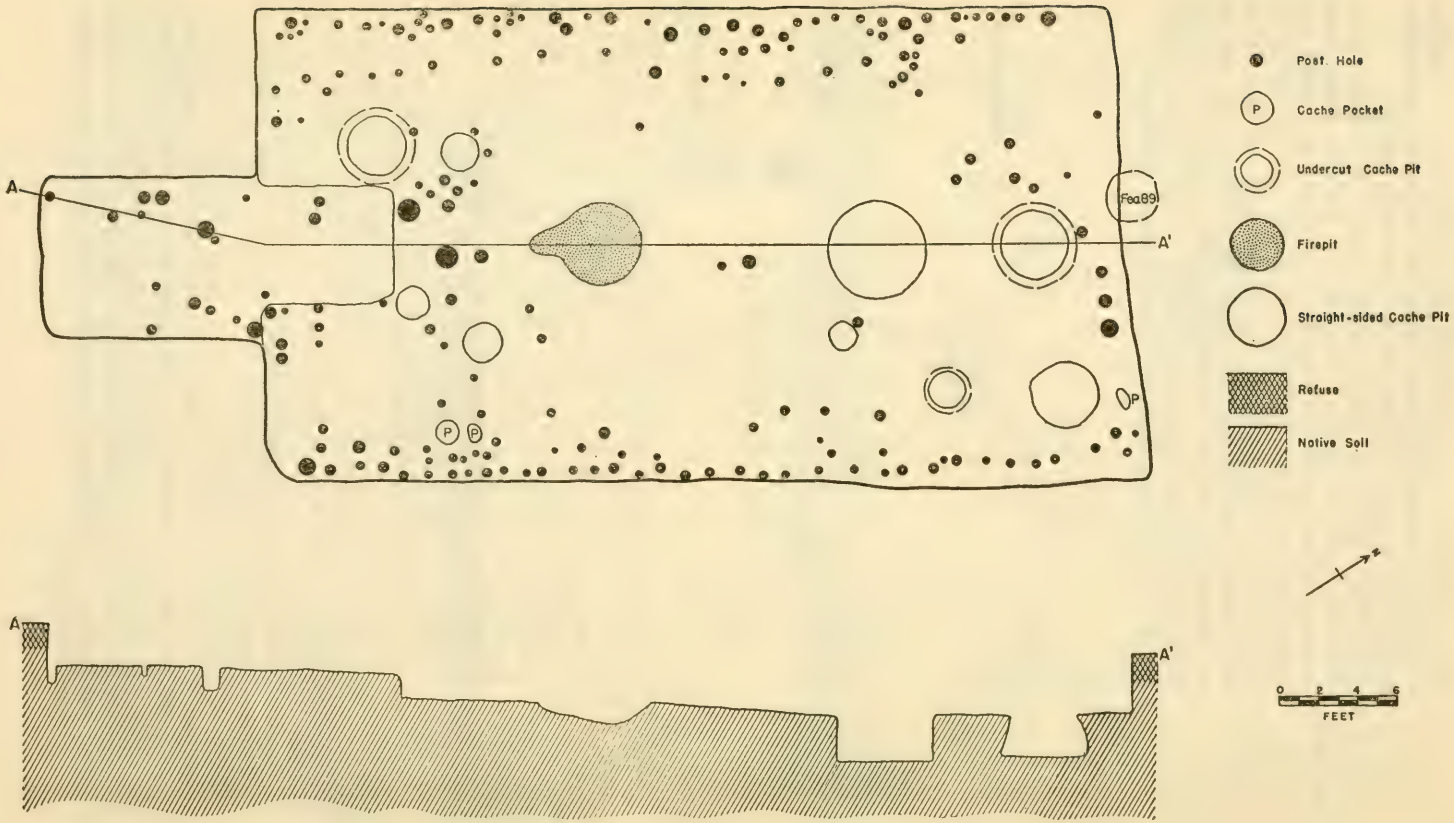

FIGURE 12.—Feature 17, Dodd site.

Entrance: There was a low earth step extending into the house pit from the south wall of the house. The step led directly into an antechamber outside the pit. The antechamber served as the entrance to the house.

Firepit: A basin filled with whitish ash located on the long axis and offset toward the south end of the house. There was a shallow extension on the south edge of the firepit.

Floor pits: Six straight-sided cache pits, three undercut cache pits, and three cache pockets. At the north end of the long axis of the house pit there was something which appeared to be an intrusive undercut cache. However, it was impossible to locate any neck for this pit and it seems likely that it was dug directly into the pit wall while the building was occupied.

Associations: None.

Comments: There was a small pile of waterworn cobbles on the floor on the long axis of the house, just north of the midline.

Feature 29 (fig. 13).

Shape: Rectangular.

Dimensions: 21.3 by 36.8 feet; depth, 4.8 feet.

Pit walls: Unfaced refuse and native soil.

Floor: Tramped bottom of the pit.

Roof supports: A series of posts set at the base of the two long sides of the house with a few scattered posts on the long axis which may have supported a ridgepole. One of the more conspicuous features of the post hole pattern is the apparent absence of wall posts across the ends of the house.

Entrance: There was a low earth step inside the south end of the house pit. The step probably led to an antechamber adjoining the south wall of the house, but we were unable to define any of the antechamber post holes during excavation.

Firepit: Located on the north-south midline, offset toward the south end of the house.

Floor pits: Two straight-sided caches and one cache pocket.

Associations: Feature 29 was definitely cut through the rectangular house (Feature 5). It underlay the circular house (Feature 1).

Comments: This house had been burned.

Feature 34 (fig. 14).

Shape: Rectangular.

Dimensions: 19.3 by 24.3 feet; depth, 3.8 feet.

Pit walls: Unfaced refuse and native soil.

Floor: Tramped bottom of the pit.

Roof supports: There was a series of post holes located at the base of both of the long walls. There are some indications of posts set to support a ridgepole. Post holes are almost entirely lacking along the end walls of the house.

Entrance: There was a short earth step abutting the south wall of the house. It presumably led to an antechamber, but we were unable to define one during excavation.

Firepit: A basin filled with whitish ash located on the long axis and offset toward the south end of the house.

Floor pits: One straight-sided rectangular pit located on the long axis.

Associations: None.

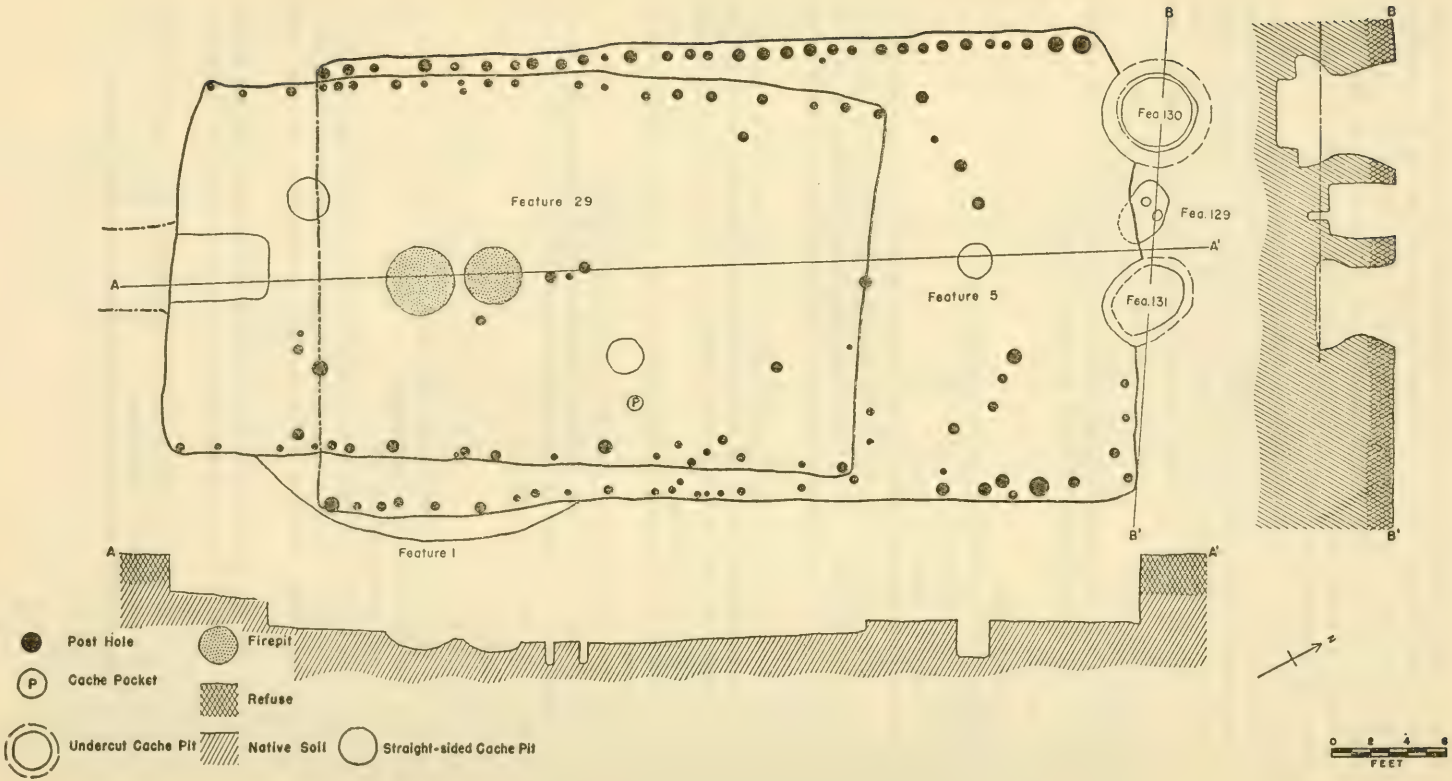

FIGURE 13.—Features 5 and 29, Dodd site.

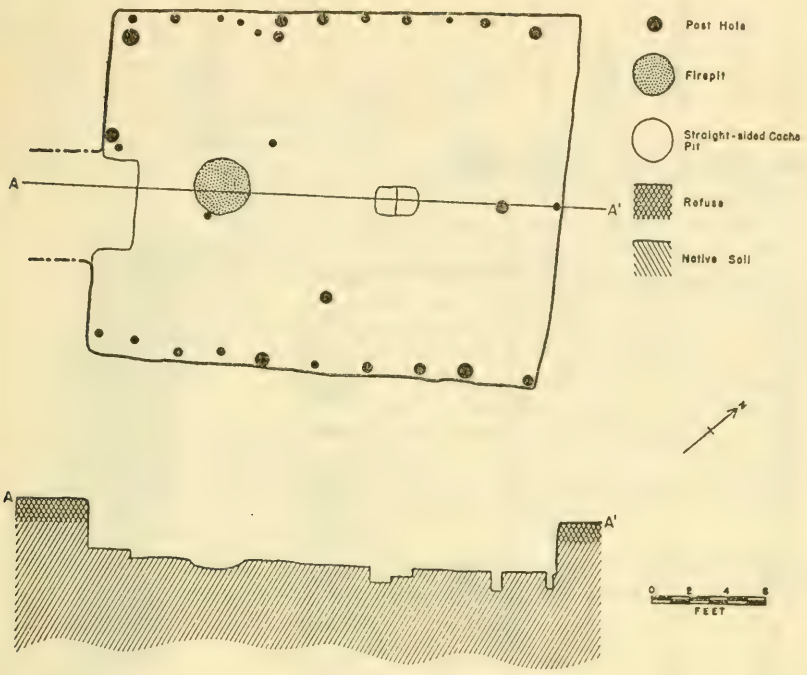

FIGURE 14.—Feature 34, Dodd site.

Feature 61–62 (fig. 15).

Shape: Rectangular.

Dimensions: 22.8 by 31.0 feet; depth, 3.5 feet.

Pit walls: Unfaced refuse and native soil.

Floor: Tramped bottom of the pit. The central part of the floor was several inches lower than the floor near the walls of the house. During the early stages of the excavation we were under the impression that we were actually dealing with two superimposed houses. However, the orientation of the lower floor with the sides of the pit, the absence of a post pattern to indicate a separate superstructure over it, and the lack of any indication of a separate entrance seemed to indicate that this was a single house in which the central part of the floor was several inches lower than the floor near the walls.

Roof supports: The main concentration of post holes was at the base of the long walls of the house. Post holes more or less on the midline seem to indicate the use of a ridgepole.

Entrance: A low earthen step projecting into the depressed central part of the floor gave access to an antechamber which adjoined the south wall of the house.

Firepit: None. Apparently destroyed when the intrusive cache pit (Feature 94) was dug.

Floor pits: One straight-sided cache pit, one cache pocket, and apparently a more or less undercut cache dug horizontally into the north wall of the house pit.

Associations: Intrusive cache pit (Feature 94).

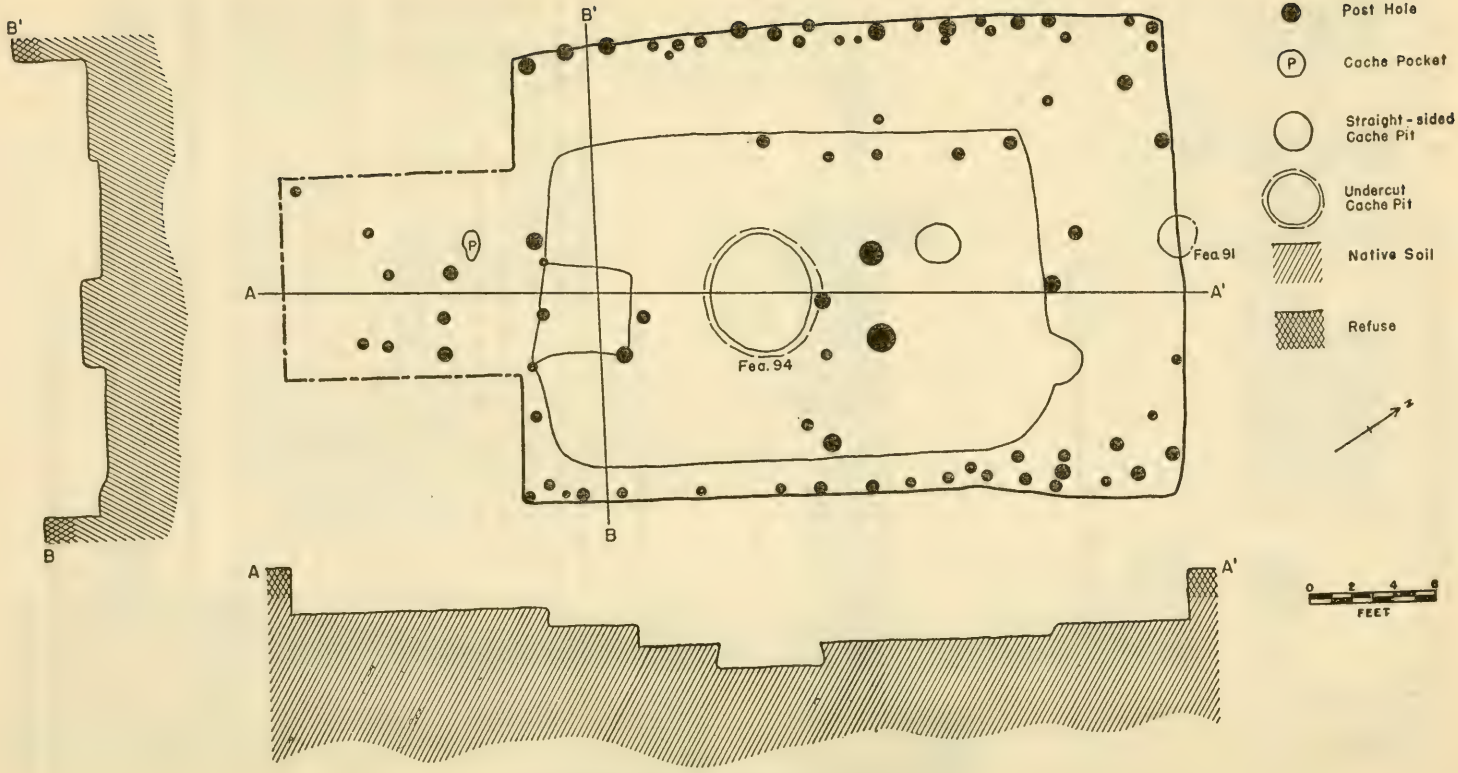

FIGURE 15.—Feature 61–62, Dodd site.

Feature 76 (fig. 16).

Shape: Rectangular.
Dimensions: 22.8 by 37.8 feet; depth, 3.0 feet.
Pit walls: Unfaced refuse and native soil.
Floor: Tramped bottom of the pit.
Roof supports: There was a heavy concentration of post holes at the base of both of the long walls of the house. Post holes were relatively infrequent along the end walls. There were two rather irregular rows of post holes parallel to the long sides of the house, which may indicate the use of a pair of ridgepoles. A concentration of post holes at the end of the entrance step and in the area between the firepit and the entrance may indicate the presence of some sort of screen.
Entrance: A low earth step abutted the south wall of the house pit. It gave access directly into the antechamber which adjoined the south wall of the house.
Firepit: A basin filled with whitish ash located on the long axis of the house and offset toward the south end.
Floor pits: One straight-sided cache pit, six cache pockets, and an irregular cache dug into the pit wall at the southwest corner.
Associations: Underlay Feature 15.
Comments: This house had been burned. There was a small pile of water-worn cobbles on the floor on the long axis of the house, just north of the midline.

Feature 88 (fig. 17).

Shape: Rectangular.
Dimensions: 22.6 by 30.1 feet; depth, 4.0 feet.
Pit walls: Unfaced refuse and native soil.
Floor: Tramped bottom of the pit.
Roof supports: There was a concentration of posts at the base of both of the long walls of the house pit. Post holes were relatively infrequent along the short walls. A concentration of post holes in the south end of the house probably indicates the presence of some sort of screen.
Entrance: Probably through the south end of the house. If a step was present, it was composed of the refuse-bearing fill of Feature 42 and was not recognized during the course of excavation. The entrance to Feature 88 was presumably similar to that in the other rectangular houses.
Firepit: A basin filled with whitish ash located on the long axis and offset toward the south end of the house.
Floor pits: None.
Associations: Cut through rectangular house (Feature 42); underlay circular house (Feature 7).

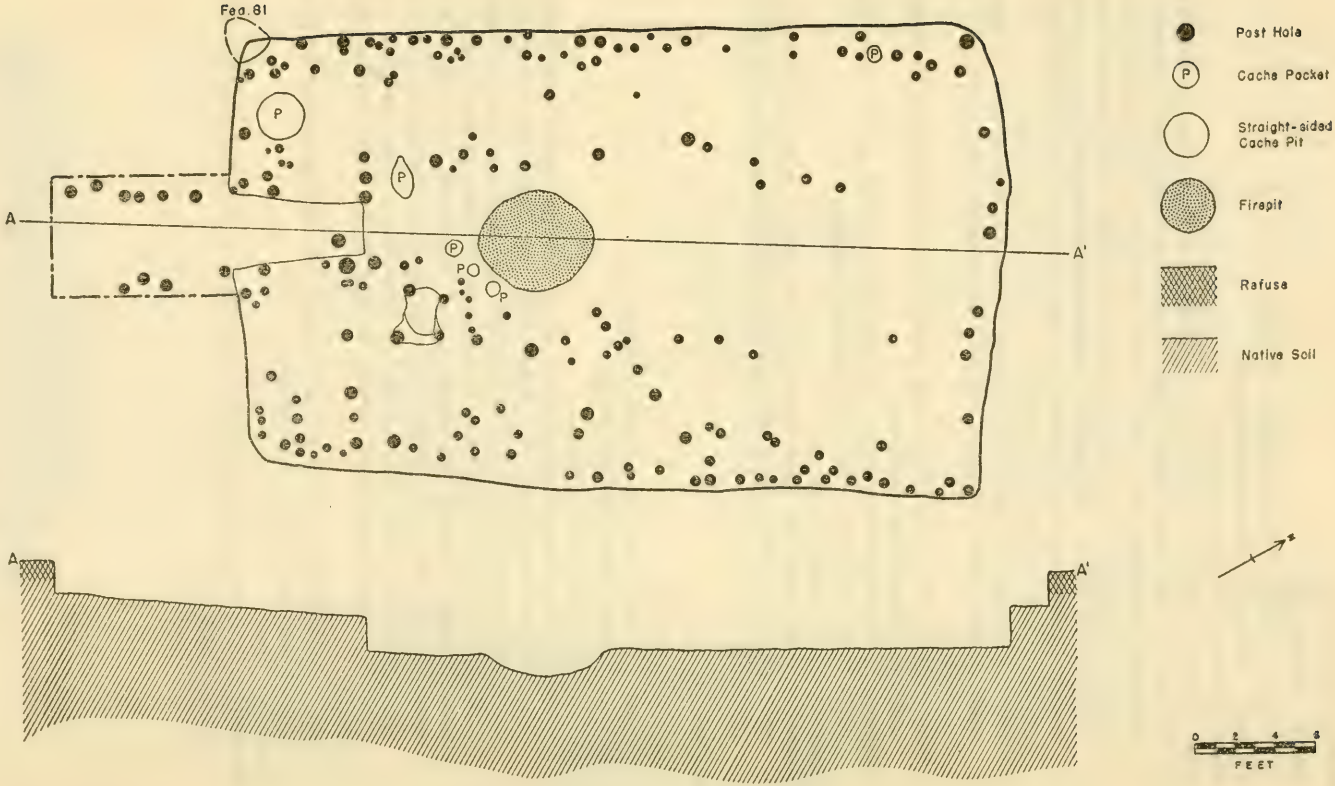

FIGURE 16.—Feature 76, Dodd site.

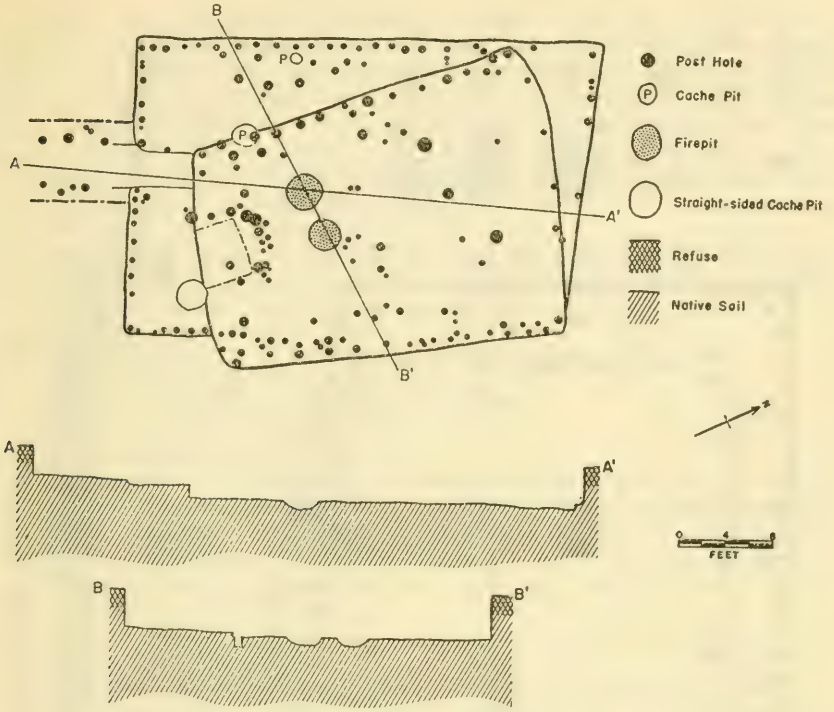

FIGURE 17.—Features 42 and 88, Dodd site.

Feature 100 (fig. 18).

Shape: Rectangular.

Dimensions: 25.5 by 35.0 feet; depth, 3.5 feet.

Pit walls: Unfaced refuse and native soil.

Floor: Tramped bottom of the pit. As in Feature 61–62, the central part of the floor was depressed, leaving low benches at the base of the pit walls. Again there is a slight possibility that we were dealing with two superimposed houses. However, it seems very unlikely that two houses constructed at different times would be as accurately oriented with each other as is the case with the upper and lower floors in Feature 100.

Roof supports: There were heavy concentrations of post holes at the base of both of the long walls of the house pit and also along the long sides of the depressed area at the center of the floor. There were relatively few posts set at the ends of the house pit, although there were a number across the north end of the depressed section of the floor. Two unevenly spaced rows of post holes parallel to the long sides of the house may indicate a pair of ridgepoles. Again, there was a cluster of post holes at the end of the entrance step which may indicate some sort of screen or partition.

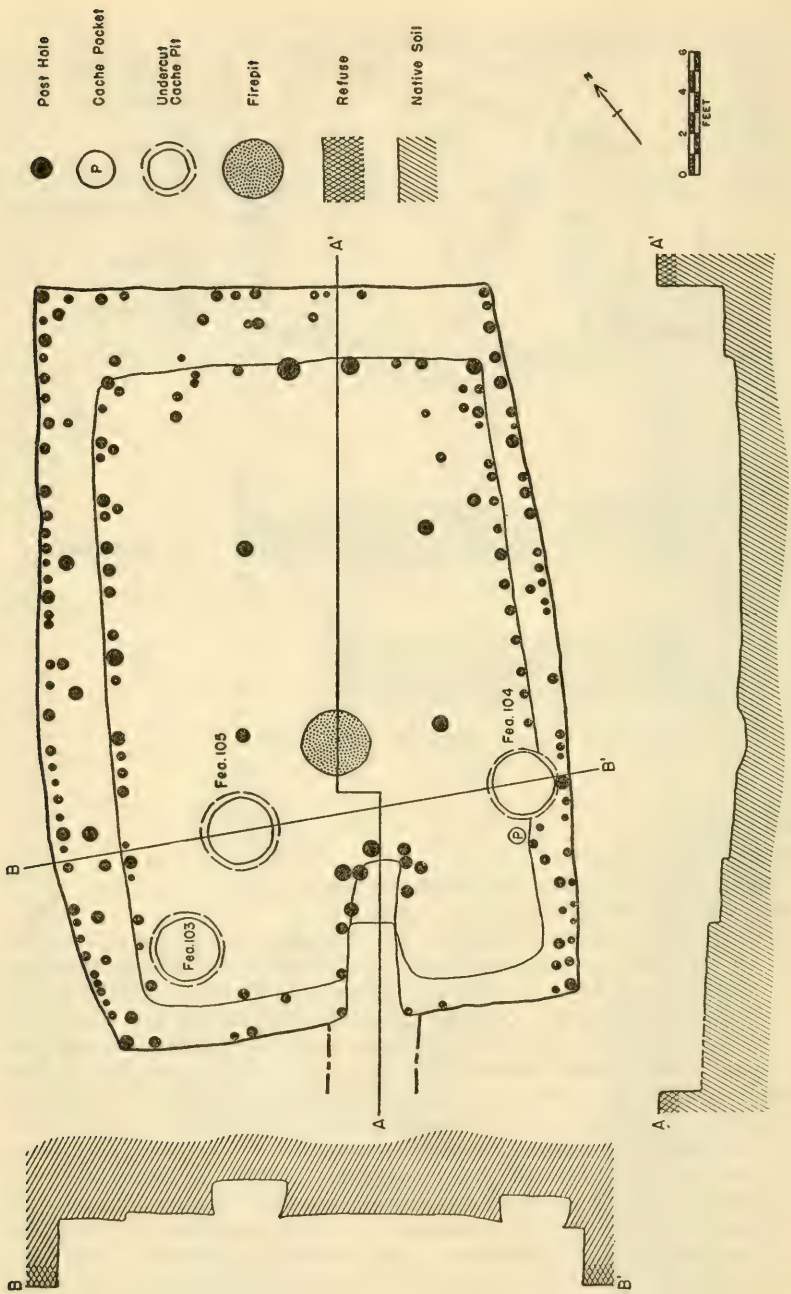

FIGURE 18.—Feature 100, Dodd site.

Entrance: A low earth step abutted the south wall of the pit and extended out into the depressed section of the floor. It probably gave access to an antechamber which adjoined the south wall of the house, but we were unable to define one. The sides of the step were unbroken, but the top was in two planes with the inner end several inches lower than the rest of the structure.

Firepit: A basin filled with whitish ash located on the long axis and offset toward the south end of the house.

Floor pits: One cache pocket.

Associations: Three undercut pits, Features 103, 104, and 105, had been dug into the fill of Feature 100 after the abandonment of the house. The lower parts of these pits cut through the house floor.

Feature 5 (fig. 13).

Shape: Rectangular.

Dimensions: 24.3 by 42.5 feet; depth, 3.8 feet.

Pit walls: Unfaced refuse and native soil.

Floor: Tramped bottom of the pit.

Roof supports: The central part of the floor had been destroyed by the construction of Feature 29. The remaining post-hole pattern indicated a superstructure with a series of posts set at the base of each of the four walls of the pit.

Entrance: Probably through the south end of the house—destroyed by the construction of Feature 29.

Firepit: A basin filled with whitish ash located on the north-south midline, and offset toward the south end of the house.

Floor pits: One straight-sided cache pit in the north quarter of the house.

Associations: Partly destroyed by the construction of rectangular house (Feature 29); underlay circular house (Feature 1). The north wall was cut by three later cache pits, Features 129, 130, and 131.

Feature 41 (fig. 19).

Shape: Rectangular.

Dimensions: 18.6 by 33.1 feet; depth, 3.0 feet.

Pit walls: Unfaced refuse and native soil.

Floor: Tramped bottom of the pit.

Roof supports: There was a series of evenly spaced posts at the base of all four of the pit walls. A number of the wall posts were set so that part of the post was recessed into the pit wall. Posts set along the long axis probably supported the ridgepole. A row of posts paralleling the long axis in the east half of the house may indicate some sort of partition.

Entrance: There was a low earth step inside the south end of the house pit. It led to an antechamber which adjoined the south wall of the house.

Firepit: A basin filled with whitish ash located on the long axis, and offset toward the south end of the house.

Floor pits: One straight-sided cache, one undercut cache, and one cache pocket.

Associations: Underlay circular house Feature 8. A large undercut cache pit (Feature 43) was so located that part of the bulge of the pit was under the north wall of Feature 41. It seems unlikely that the two features were contemporary, but it was impossible to determine which one was the earlier.

Comments: The fill of the pit of Feature 41 contained an extremely heavy concentration of animal bones. There was a small pile of waterworn cobbles on the floor on the long axis of the house, just north of the midline.

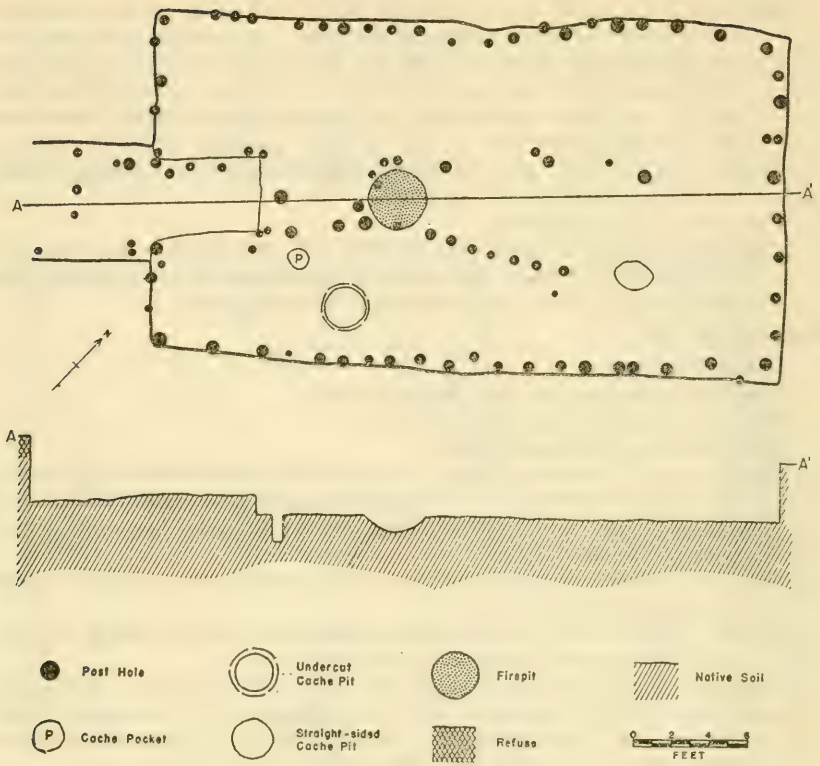

FIGURE 19.—Feature 41, Dodd site.

Feature 42 (fig. 17).

Shape: Rectangular.

Dimensions: 25.8 by 37.8 feet; depth, 3.7 feet.

Pit walls: Unfaced refuse and native soil.

Floor: Tramped bottom of the pit.

Roof supports: A series of evenly spaced posts set at the base of all four walls of the house.

Entrance: A low earth step abutted the south wall of the house giving access to an antechamber. There was a slight rise from the top of the step to the floor of the antechamber.

Firepit: A basin filled with whitish ash located on the long axis and offset toward the south end of the house.

Floor pits: One straight-sided cache and two cache pockets.

Associations: A large part of Feature 42 had been destroyed when the rectangular house Feature 88 was constructed. The floor of Feature 88 was several inches lower than that of Feature 42. Both Features 42 and 88 underlay circular house Feature 7.

Feature 95 (fig. 20).

Shape: Rectangular.

Dimensions: 21.0 by 30.0 feet; depth, 2.2 feet.

Pit walls: Unfaced native soil.

Floor: Tramped bottom of pit.

Roof supports: There was a series of more or less evenly spaced post holes at the base of the two long walls of the house pit and across the north end of the pit. Centrally located post holes may indicate the use of a ridgepole. A concentration of small post holes in the northwest corner of the floor seems to indicate the presence of some special feature there.

Entrance: A low earth step abutted the south wall of the house and probably gave access to an antechamber. We were unable to locate any post holes in the antechamber itself.

Firepit: A basin filled with whitish ash located on the long axis and offset toward the south end of the house.

Floor pits: Two cache pockets.

Associations: Underlay Feature 25 and the upper part of the pit was destroyed during the construction of Feature 25.

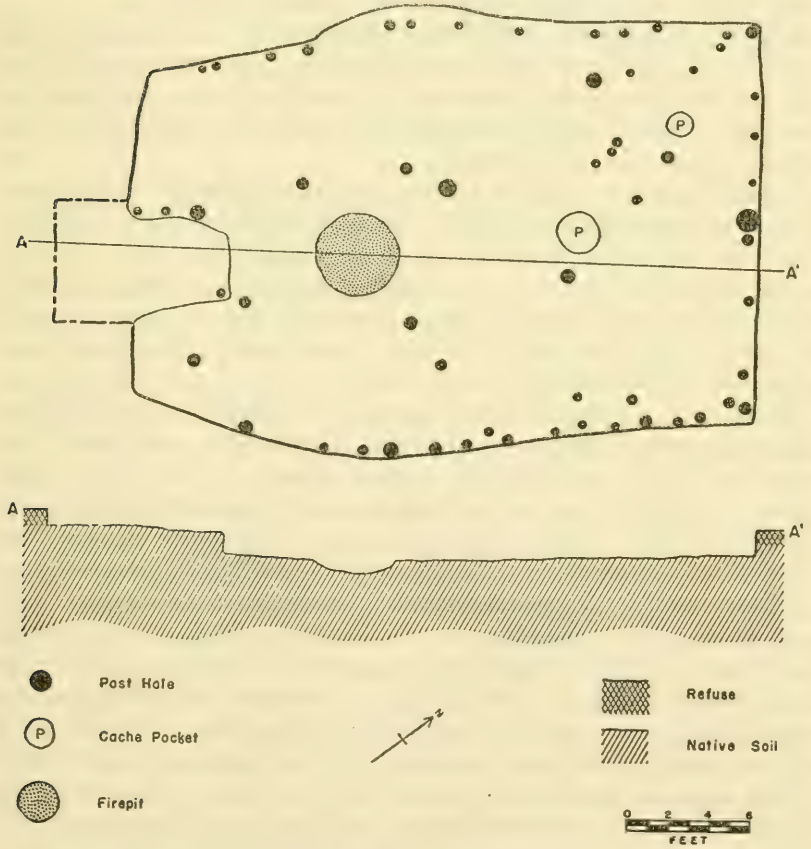

FIGURE 20.—Feature 95, Dodd site.

The round houses, Features 1, 7, 8, 11, 15, 35, 73, 106, and 107, stand together in contrast to the other houses at the Dodd site. All of them were characterized by a more or less circular floor in a pit dug from 1.5 to 2.8 feet below the present ground surface. There was no sign of plastering on any of the pit walls. Floors were simply the tramped bottom of the pit, with no indication that any surfacing material had been brought in. In those houses which had been built over an earlier structure, there was a heavy concentration of trash within the floor of the upper house. The round houses were entered by way of a passage on the east or northeast side of the structure. The passage was at right angles to the line of the two primary roof supports on the east side of the firepit. The entrances were walled and roofed, and in most cases there was a well-defined set of holes which had contained the framework posts. The entrance floors usually rose somewhat at the end away from the house.

Firepits were always basin-shaped and located at the center of the house floor. The basin itself was burned hard, and was usually filled with a compacted whitish wood ash. In several cases the firepit had been used after it was completely filled with ash, and the fire had spread over the adjoining floor.

Post holes appeared as soft cylindrical pockets in the house floors. Diameters ranged from 0.2 to 2.4 feet, and depths from 0.4 to 3.8 feet. The holes were filled with porous earth which often contained fragments of decayed wood or the charred butt of the post. It was a common practice to tamp the larger posts with one or more waterworn cobbles or with a section of a large bison bone. The posts themselves were either juniper or cottonwood.

There were a number of variations in the details of the individual superstructures of the circular houses. However, in every case there were four central supports set in a rough square with the firepit at the center. The individual supports occasionally consisted of more than one post. There was a scattering of smaller posts between the central four and the edges of the floor. The individual houses showed a marked variation in the number and placement of the superstructure posts at the edge of the house floor. Features 1, 7, 8, 11, 73, and 106 had 10 or 12 posts set well apart around the circumference of the pit. In Features 15 and 35, there were large numbers of posts set in a zone several feet wide around the outer edge of the floor. Feature 107 is more or less intermediate between the two groups, having two more or less concentric circles of posts. There is a direct correlation between the two post arrangements and the size of the house. Diameters in the first group ranged from 24 to 27 feet. Features 15 and 35 were substantially larger, with diameters of 42 and 34 feet

respectively. Feature 107 is again intermediate, with a 29-foot diameter.

Pits in the floors were comparatively rare. However, undercut, straight-sided, and pocket caches were all found in the floors of the circular houses. All of them appeared to have been dug while the houses were occupied. Other holes in the floors may have contained wooden mortars after the fashion of the historic Arikara and Mandan. These holes were cylindrical, somewhat larger than the largest post holes, and were always located more or less on a line between the firepit and the entrance. They were generally slightly offset toward the entrance from a line connecting the eastern pair of primary roof supports.

Various accounts of the historic earth lodges in this section of the Missouri Valley mention a domestic "altar" against the wall opposite the entrance. The only trace of any such arrangement at the Dodd site was on the floor of Feature 8, at the base of the northeast quadrant of the wall. It was an oval patch of flaked Pierre shale measuring roughly 1.5 by 2.5 feet and 3 inches thick. On the shale there were two waterworn cobbles, six large simple-stamped sherds, a piece of bison rib, and a hoe fashioned from the nasal and frontal bones of a bison (pl. 8). In Features 15 and 35 there was a marked increase in the width of the zone of peripheral posts opposite the entrance, which may indicate the presence of some sort of platform there.

On the basis of the post-hole patterns, a few charred beams on the floors of various houses, and the burned superstructure material found in Feature 35, it is possible to make a fairly accurate reconstruction of the superstructures of the circular houses at the Dodd site. The four primary supports which surrounded the firepit almost certainly carried a square of four stringers. The second basic member of the superstructure was the series of posts around the edge of the floor. In those houses which had only a few posts in this position, the tops were almost certainly connected by stringers. The form of this member in Features 15 and 35 is somewhat doubtful.

The upright posts and the connecting stringers made up the framework of the superstructure. On the basis of the charred material from Feature 35, the walls consisted of a vertical layer of overlapped split wood "bats" some 2 inches thick. They were apparently set on the pit floor and rested against the framework. They were bound together by transverse willow shoots set about 3 inches apart and blanketed with a vertical layer of coarse grass. The roofs apparently consisted of poles 2 to 3 inches in diameter laid close together and blanketed with grass. The entire house was presumably covered with earth or sod. The entrances were probably roofed in the same fashion as the house proper. Judging by the historic accounts of

similar structures, there was a skylight-smokehole left open in the center of the roof.

Feature 25 stands somewhat apart from the rest of the circular houses at the Dodd site. It was by far the largest structure in the village, and the octagonal form, the unusual regularity of the post arrangement, the length of the entrance, and the presence of an altar all served to set it apart. These distinguishing features all indicate some sort of specialized function for the structure, very probably one analogous to the Arikara "ceremonial lodge" or "council house" described in the early historic accounts of the area.

Houses 17, 29, 34, 61–62, 76, 88, 100, 5, 41, 42, and 95 at the Dodd site stand together as a typological group. They are all characterized by a rectangular pit, oriented with the long axis more or less north-south. There was no sign of plastering on any of the pit walls. Floors were simply the tramped bottom of the pit, with no indication that any surfacing material had been brought in. The entrance was always in the south wall of the house. Each of the entrances consisted of a step inside the house pit and probably an antechamber which adjoined the south wall of the house. We were not always able to define the antechamber, and this feature may not have occurred on all of the houses. Firepits were more or less basin-shaped and were located on the north-south axis, offset toward the south end of the pit. The basins were burned hard and were usually filled with a compacted whitish wood ash. The firepits had frequently been used even after they were filled with ash, and the fire had spread over the adjoining floor.

Post holes were soft cylindrical pockets in the house floors, diameters ranging from 0.2 to 2.6 feet, and depths from 0.3 to 3.9 feet. The holes were filled with porous earth which often contained fragments of decayed wood or the charred butt of the post. The larger posts were occasionally tamped with waterworn cobbles or with large bison bones. However, this seemed to be less common than in the circular houses.

There were some individual variations within the rectangular houses. Features 61–62 and 100 both had a central portion of the floor dug somewhat lower than the edges so as to leave a bench around the sides of the house. Features 17 and 76 had unusually large numbers of posts set along the long sides of the house pit, probably a function of the fact that these two houses were somewhat larger than the other rectangular structures at the site. There is no evidence that either of these variants can be set off from the other rectangular houses with few end posts, either in time or on the basis of the associated artifacts.

It is, however, possible to distinguish two styles within the entire group of rectangular houses. Features 17, 29, 34, 61–62, 76, 88, and

100 all had the great majority of the post holes at the base of the long walls of the house pit. Features 5, 41, 42, and 95 were distinguished from the other rectangular houses by having posts set at more or less even intervals along all four walls of the pit. In both cases of superposition involving rectangular houses, this latter type was the earlier. There are also differences in the pottery and artifact material associated with the two styles of rectangular houses, differences which appear to justify assigning them to different foci.

Unfortunately, superstructure remains were not found in any of the rectangular houses at the Dodd site. On the basis of the arrangement of the post holes, it would appear that there was a considerable difference between the way in which the two styles of rectangular houses were built. Features 5, 41, 42, and 95 had the wall posts evenly distributed around all four sides, an indication that all of the walls were built in the same way. The wall posts in the other rectangular houses were mainly concentrated on the long sides of the pit, indicating a difference in the construction of the side and end walls of the houses.

It is difficult to make any statements regarding the type of roof. Single or double rows of large post holes were found on or parallel to the long axis of most of the rectangular houses. These seem to indicate the presence of heavy posts which carried longitudinal members of the roof. It is impossible to know whether the roof itself was a vaulted affair reminiscent of a Quonset hut, or gabled with two or three planes. However, the fact that historic rectangular houses in the Plains, such as those shown by Bushnell, seem to have had vaulted roofs may be an indication that this was the case at the Dodd site (Bushnell, 1922, pls. 21, 22, *a*).

THE CACHE PITS

A total of 72 pits which presumably had been used for storage purposes were excavated at the Dodd site (fig. 21). Twenty-four of the caches were located away from any house, 48 of them were inside the houses. Some of the latter were contemporary with the house in which they occurred, others had been intruded into the abandoned house pit.

The intramural pits fall into three classes: undercut, straight-sided, and cache pockets. The undercut pits had been sunk through the house floors. They were dug with a short neck or no neck at all, and an expanding body which generally reached its greatest diameter at the bottom of the pit. Depths ranged from 1.3 to 3.4 feet, maximum diameters from 1.8 to 6.1 feet, and minimum diameters from 1.0 to 5.2 feet. The pit walls were generally curved. The straight-sided pits ranged from more or less circular through oval to irregular

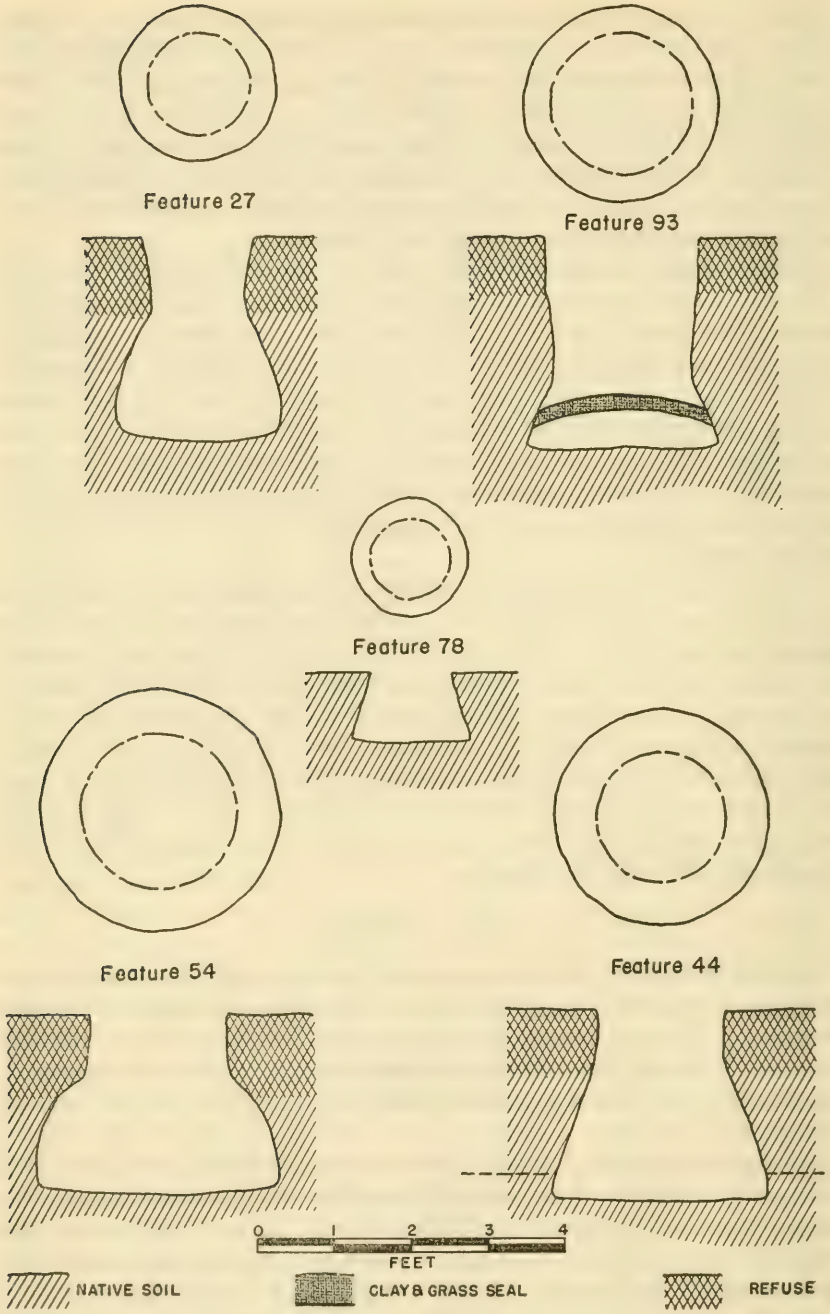

FIGURE 21.—Undercut cache pits at the Dodd site.

in outline. The sides were vertical, and the bottoms tended to be somewhat uneven. Diameters ranged from 0.9 to 3.3 feet, depths from 0.6 to 2.3 feet. It is possible that some of the features which have been classified as straight-sided caches were actually large post holes. However, the majority were larger and shallower in proportion to the diameter than the post holes, and were not located in any discernible relationship to the post pattern of the house. The cache pockets were shallow basin-shaped holes in the house floor. Diameters ranged from 0.5 to 1.3 feet, and depths from 0.3 to 0.6 feet. It is possible that some of them were scooped out to serve as rests for the round-bottomed pots which are characteristic of the site. However, caches of chipped-stone artifacts and blanks were found in pockets in the floors of rectangular houses Features 29, 76, 95, and 100 and in the entrance of circular house Feature 7.

Three rather unusual cache pits were also found associated with the house interiors. One, Feature 81, was located in the southwest corner of the rectangular house Feature 76. It had been dug back horizontally into the corner of the lodge pit. The cache was irregular in shape, and the bottom was slightly below the house floor. A comparable situation was found in the rectangular house Feature 17. At the north end of the long axis of the house pit there was something which at first appeared to be an intrusive undercut cache pit. However, it was impossible to find any neck, and it seems likely that it was dug directly into the pit wall of Feature 17 while the house was occupied. What appeared to be an identical feature was present in the same position in rectangular house Feature 61–62.

There were two straight-sided cache pits outside the houses. Both of them were irregular in plan, with dimensions of 2.0 by 3.3 feet and 1.5 by 2.0 feet. The former was 3.5, the latter 3.0 feet deep. The remainder of the outside caches were undercut. They were generally larger than those which were found in the house floors. Depths ranged from 3.0 to 7.2 feet, maximum diameters from 3.4 to 6.6 feet, and minimum diameters from 1.6 to 3.8 feet. As a rule the maximum diameter was at the bottom of the pit, but it occasionally occurred as much as 1.5 feet above the floor. The pit walls were usually curved rather than straight, and the bottoms were concave. In general, the undercut caches outside the houses had longer necks and a proportionately smaller opening than those which were dug through the house floors. Feature 3 presented a very unusual situation. It consisted of an undercut cache pit with a second one dug through the floor. The two pits were undoubtedly contemporary, and the addition of the lower compartment seems to have been a byproduct of the builder's secretive nature.

In several instances we found evidence of the use of a lining in the

undercut cache pits. In Feature 72, thin strips of bark had been laid in the floor, radiating out from the center. In Feature 44 there were definite traces of strips of bark laid vertically against the pit walls, and two layers in the pit fill had probably slumped down off the walls after the contents of the pit were removed. There is some question about the way in which the lining was held against the pit wall. If it was put in bit by bit along with the contents, the material being stored would have held it in place. However, in Feature 4–A, a charred fragment of split wood "bat" similar to those used in the house walls lay vertically against the pit wall and was a tantalizing hint of the possibility of the use of some sort of wooden framework.

In one of the undercut cache pits, Feature 93, we found a seal (pl. 8) which had apparently covered the contents of the pit. It was a domed layer of clay with a maximum thickness of 0.5 foot which was set from 0.5 to 1.0 foot above the floor of the pit. It was built up by alternating layers of clay with prairie grass and bark. The gray silty clay had probably been brought from the river channel. A bison skull and a bison pelvis with four vertebrae attached were partly incorporated into the top of the seal, and an unworked bison scapula lay near them. There were impressions of several ears of corn in the bottom of the seal.

A number of the caches intersected other features, either houses or caches. Unfortunately, there were only two such cases in which we were able to determine the sequence in the field. The fill of the cache pits and the house pits was almost always identical in color and texture, which made it impossible to define the limits of the younger excavation where it cut through older trash. The circular house, Feature 8, was definitely superimposed over Feature 43, since the firepit had been cut into the cache fill. The fill of the cache, Feature 96, stood out in sharp contrast to the more compact fill of the rectangular house, Feature 98, and the cache had obviously been dug into the house fill. The same cache pit was also definitely earlier than the overlying circular house, Feature 11, since the house floor continued unbroken over it. The remainder of the cache pits, except for those which were definitely associated with a house, were assigned to the occupational component on the basis of their contents.

BORROW PITS

Features 63 and 75 were roughly circular pits with concave floors. Feature 63 was more or less oval with maximum dimensions of 9.3 by 7.1 feet. The lowest part of the floor was 2.4 feet below present surface and 1.4 feet below the top of the native soil. Feature 75 averaged 9.8 feet in diameter. Its floor was a maximum of 1.8 feet below present ground surface and averaged 0.5 foot below the top of

the native soil. There was a straight-sided irregular hole some 2.2 feet in diameter and 1.2 feet deep in the floor of Feature 75. Aside from this secondary pit, there were no floor features of any sort in either Feature 63 or Feature 75. There was no trace of burning in either of the two pits. In both cases the fill contained a very heavy concentration of refuse, including an unusually large number of animal bones. In neither case was there any indication of a function for the pit itself, and it seems likely that they were borrow pits from which earth was taken to cover the lodges in the village. The open pit would, as in a contemporary American community, have been an invitation for garbage disposal.

FIREPITS

Features 2 and 64 were circular, basin-shaped firepits identical in form with those which were found in the houses. However, they were completely dissociated from any house structure. They appeared to represent some sort of cooking (?) arrangement carried on outside the houses.

HEARTHS

Feature 6 was a mass of heat-fractured stone, ash, and charcoal which was exposed in cross section in the present cut bank of the Missouri River just below the village. It was 4.7 feet below the top of the first terrace above the river. The top 3.0 feet of the overburden was completely sterile. There was a bison humerus 0.7 foot above the top of the hearth. When excavated, the hearth had maximum dimensions of 4.6 by 2.8 feet. However, part of it had been destroyed by channel cutting of the river. The associated pottery indicated that the hearth was contemporary with the occupation of the village proper.

Several times during the course of stripping sod with the heavy equipment, similar features were exposed between the houses in the village.

BURIALS

Only one burial (pl. 10, *a*) was found at the Dodd site. It consisted of a single skull without mandible or cervical vertebrae. The skull was in the northeast quarter of the fill of the pit of the rectangular house, Feature 100. It was 1.2 feet above the house floor, and 2.2 feet below ground surface at the time of excavation. The skull lay on its right side, facing north. There were definite hematite stains on the parietals, the occiput, and on the palate. The upper two-thirds of a Foreman Incised pot lay on its side 1.4 feet in front of the skull. There was a small fragment of rolled sheet copper 1.6 feet

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from the base of the skull. The skull, the pot, and the copper all lay at the same level. We were unable to define any grave pit, so it is impossible to say definitely whether or not all three objects should be associated. However, it seems likely on the basis of proximity. If they do belong together, this almost certainly was a reburial dating from the final occupation of the site, since metal was not present in the horizons in which Foreman Incised pottery occurs. The absence of bones other than the skull seems to bear out this assumption.

We still have no data on the mortuary customs characteristic of the various components at the Dodd site. The single calavarium found certainly does not represent the total deaths during the occupation. A checkerboard of test pits was put down in the area just outside the fortification ditch, and several tests were made on the crest of the steep-sided hill adjoining the south section of the village, all with negative results.

Occasional burials are found along the section in which the high ground breaks down into the Missouri Valley. They are usually located on prominent places and are marked by stone cairns. We excavated one (site 39ST53) in 1950. It was about seven-eighths of a mile south of the Dodd site, in the NE¼ of sec. 31, T. 6 N., R. 31 E. The surface indications consisted of a circular bolder cairn some 15 feet in diameter.

A trench 3 feet deep was cut tangent to the cairn, and then broadsided into it. Figure 22 shows a midline section through the cairn. There was an old excavation at the center of the cairn which seemed to represent two graves. The upper one was basin-shaped, with a maximum diameter of 7.5 feet and a maximum depth of about 2.5 feet. Below this was a second grave. It was impossible to define its exact dimensions since it had been excavated into and refilled with gravel. It appeared to be roughly oval, some 2.5 by 3.5 feet, and the bottom was about 2.5 feet below the bottom of the upper grave. The fill in the upper grave was a dark humus-stained silt and contained a number of boulders similar to those composing the cairn.

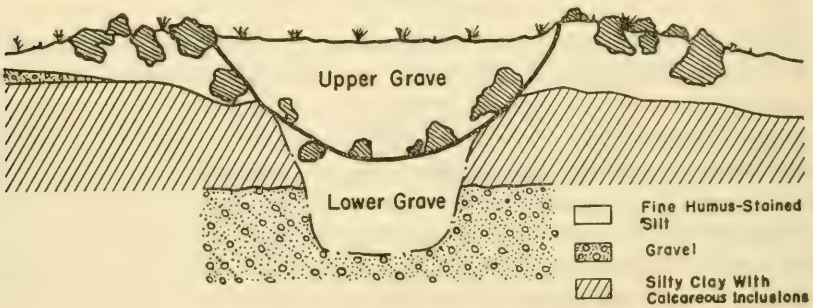

FIGURE 22.—Cross section through grave and rock cairn, 39ST53.

The upper grave contained a number of fragmentary, disarticulated, human bones, some of which showed definite traces of burning. At least two individuals were represented, a subadult and a young adult. One or two fragmentary bison bones were also present in the upper grave. There was no associated artifact material. The lower grave contained the articulated skeleton of an adult male, complete from the pelvis up. There were no leg or foot bones present. The body had been buried lying on its back, facing east. The left arm was extended, the right partly flexed across the pelvic region. The head was bent forward on the chest in a way that suggested a flexed or semiflexed burial. The only artifact material associated was a group of 741 discoidal shell beads which had been strung into three strands and incorporated into some sort of headdress. There was no possibility that they had been worn as a necklace, since the strands passed over the occipital region and were behind the cervical vertebrae (pl. 10, *b*).

Unfortunately, nothing was found at site 39ST53 which would relate it to any of the villages in the area. It certainly represents two separate burials, each of which probably relates to a different cultural complex. The burial in the lower grave was a partly flexed inhumation in a deep pit which was marked with a boulder cairn. The upper grave contained a secondary burial. It had been intruded through the cairn marking the older interment. The boulders in the upper grave were presumably part of the cairn which had been displaced when the upper grave was dug and were thrown into it when it was refilled.

During the spring of 1951, construction of the access railway to the Oahe dam area exposed a number of burials which appeared to be associated with the site designated as 39ST15. This village is located about 2.3 miles downstream from the Dodd site, and 1.2 miles below the Phillips Ranch site, which is reported in a later section of this paper; 39ST15 is an unfortified village with depressions indicating the presence of at least 50 earth lodges. There are some indications of more than one component at the site. The site is located just north of Indian Creek, on the edge of the terrace which bounds the flood plain of the Missouri River. The burials were encountered some 60 to 75 yards west of the last house depression in the village.

A number of burials were exposed by the construction equipment, and two of them were removed by the Pierre Unit of the MBP during the 1951 season. Burial 1 had been interred in an oval pit 5.2 by 2.8 feet. The floor of the grave appeared to have been about 3 feet below ground surface prior to the excavation of the railroad cut. The skeleton was lying on the back, head north, arms extended along the sides. The legs had been detached from the body prior to burial.

The relationship of the leg bones to each other indicated that they had been articulated when they were placed in the grave. The legs were flexed and oriented in line with the axis of the rest of the skeleton, but the knees were adjacent to the pelvis and the feet and femoral heads were away from it (pl. 11, *a*). Mortuary offerings included a small side-notched triangular projectile point (Dodd, Group 1), a small Stanley Cord Impressed jar with incised shoulder, and a fragment of basketry. The basket fragment appeared to be the remains of a larger piece or a whole basket which had been inverted over the face and which had been partly destroyed by the construction equipment which exposed the burial. It is described in a later section, together with the basketry fragments found at the Phillips Ranch site.

Burial 2 at 39ST15 was located about 25 yards south of Burial 1. The grave was approximately round with one flat side, and measured 4.8 by 4.2 feet. The floor of the grave appeared to have been about 2.5 feet below ground surface prior to the excavation of the railroad cut. The skeleton was lying on the back, head north and tilted slightly toward the left shoulder. The right arm had been torn away by the construction equipment; the left was extended along the side. The legs were flexed in a normal position, but the proximal ends of the diaphyses were several inches above the level of the acetabula, indicating that the legs may have been detached from the trunk before burial (pl. 11, *b*). There was a fragmentary infant skull just east of the feet of the skeleton. Mortuary offerings consisted of the fragments of a small simple-stamped jar with an unbraced wavy rim which were scattered through the grave fill, and two tubular beads made of rolled sheet copper.

It is difficult to evaluate the possible relationship of these burials to the cultural complexes at the Dodd site, but the presence of a Stanley Cord Impressed jar in association with Burial 1 and the association of copper beads with Burial 2 at 39ST15 may indicate that they date from approximately the same time horizon as the roundhouse component at the Dodd site.

THE ARTIFACT MATERIAL

POTTERY [2]

The pottery from the Dodd site presented a number of problems outside the writer's previous experience. Instead of a series of painted types and a mass of culinary ware, all of the sherds looked like material which should be relegated to a catch-all "utility" category. The pottery analysis proceeded by jerks and pauses, and was frequently

[2] Descriptions of the Dodd site pottery were originally published in the Plains Archeological Conference News Letter, vol. 4, No. 2, September 1951. Descriptions of the Foreman Cord Impressed and Foreman Incised types have also been published (Hurt, 1951 b).

prodded into new blind alleys by the well-meant suggestions of others. In the end, the following categorization emerged. Its justification lies in the fact that it seems to recognize divisions which have either historical or cultural significance, divisions which would presumably have been recognized by the makers as well as by the archeologist.

The descriptions are based on a total of 14,129 body sherds, 1,661 rim sherds, and 5 restorable vessels. The pottery was washed in the field laboratory, and the rim sherds were cataloged there. The rim sherds were studied en masse in order to have a reasonably large sample with which to work, and in order to avoid judgments based on preconceptions as to what should be found in a certain provenience. The body sherds were not cataloged, but were analyzed from and resacked into the field bags. They were classified into four main categories: cord roughened, simple stamped, brushed, and plain. The cord-roughened sherds were those with a surface which had been impressed with a cord-wrapped paddle. The simple-stamped sherds had been impressed either with a paddle carved to have a series of parallel ridges, or one which was wrapped with strips of some smooth material such as leather thong. In general it was easy to distinguish the two treatments by the relative width of the impressions and of the intervening spaces as well as by the nature of the impression itself. Brushed sherds carried a series of sharply defined parallel scratches which were apparently made with a handful of stiff coarse grass. Brushing seems to have been confined to the vessel neck, and seems to have been associated with a simple-stamped body. The majority of the plain sherds had been smoothed, but not polished. A few were comparatively rough, and occasionally carried random striations.

Almost all of the rim sherds from the Dodd site have been assigned to one of three wares. The wares may be thought of as groups of types which share a majority of basic characteristics including the fabric of the pottery itself, the general vessel form, the surface finish, and the basic rim form. The types which are included in the wares are primarily groups of similar rim sherds, all of which are decorated in more or less the same way.

Some workers might argue for more types, separating, for example, the braced rims with horizontal cord impressions from those with diagonal cord impressions. Such a division could be carried on to separate diagonal impressions running in one direction from those running in the opposite direction, to separate those sherds with diagonal impressions on the exterior only from those on which the impression runs over the lip, and so on ad nauseam. In the writer's opinion, such a procedure would obscure the information which is gained by classifying the material in the first place. Hence, such variants have been grouped within the same type. They will pre-

sumably deserve elevation to types only when it is possible to demonstrate conclusively some spatial or temporal significance for them.

In general, rim form has been a better type diagnostic than particular decorative elements. For example, nearly 400 of the rim sherds from the site were decorated with a series of horizontal cord impressions. Over 75 percent were from vessels with S-rims or flared rims, the remainder were braced rims. There is a very close correlation between the S-rim and flared-rim pieces and the early occupations at the site, and between the braced rims and the final occupation, although that particular decorative element appeared in both contexts.

In describing the pottery, characteristics common to all of the types assigned to one ware have been listed under the ware description; the type descriptions have been restricted to those features which distinguish that particular type. The traditional "method of manufacture" has been omitted from the descriptions. Nearly all the Dodd site pottery is paddled over at least a portion of the exterior surface, which suggests the technique of modeling the vessel up from a lump of clay. This is further substantiated by the frequent development of internal cleavages parallel to the surface of the vessel wall.

The classification presented here is a tentative one, subject to modification on the basis of new and more complete data. The present treatment is the writer's best effort at a happy medium between lumping to an extent that would obscure significant differences, and splitting on the basis of minutiae to the extent that trends and associations were lost in a welter of details. A good indication of the classification's validity is the fact that sherd material from other sites can be readily classified on this basis by other workers. Sites in the Fort Randall Reservoir excavated by Wesley R. Hurt, Jr., and Carlyle S. Smith contained minority groups of pottery which were dealt with on the basis of the following divisions. It was also possible to categorize almost all of the pottery from a second season's work in the vicinity of the Oahe Dam on this basis.

Stanley Braced Rim Ware

(*Ware sample: 5,246 simple stamped and brushed body sherds, 582 rim sherds*)

Paste:

Tempering: Grit, diameters ranging from 0.5 to 2.5 mm. The appearance and composition (quartz, mica, and some feldspar) of the tempering material suggests that it is a decomposed granite, a suggestion borne out by the presence of a number of partly decomposed granite fragments at the Dodd site.

Texture: Medium to coarse. There is a common tendency to develop internal cleavages parallel to the vessel walls.

Hardness: 2.5–4.0.

Color: Gray to yellowish tan. The majority of the exterior surfaces are blackened by a carbon deposit. Firing clouds occur on both the interiors and exteriors, but most commonly on the exterior.

Form:

Overall shape: Jars with rather high, slightly curved necks, rounded shoulders, and generally subconoidal bottoms.

Lip: Generally rounded, but occasionally either sharp or flattened.

Rim: The vessels assigned to this ware have braced rims, and this trait stands as one of the more distinctive characteristics of the ware. The bracing was produced by adding a fillet of clay which extends from the lip down onto the outside of the neck. The top always blends into the lip; the bottom of the fillet sometimes stands out from the neck and is sometimes blended into it. The bracing fillet is generally higher than it is thick, but in some instances it is almost circular in cross section. There is a fairly common tendency for the rim brace to break away from the vessel wall.

Neck: Rather high and slightly curved.

Shoulder: Rounded, with a marked difference in the plane of the vessel wall above and below the shoulder. The shoulder is above the midpoint between the lip and the base.

Base: Subconoidal.

Surface finish: Bodies predominantly simple stamped, but with occasional plain areas at or near the base. Necks are most commonly brushed vertically or at a slight angle to the vertical on the exterior, and horizontally on the interior. They are sometimes plain, and are very rarely simple stamped. Vessel interiors are smoothed except at the neck.

Decoration: Varies with the individual types. One group, consisting of 3 rim sherds and 29 body sherds, deserves special mention. The rim sherds include 2 Stanley Cord Impressed and 1 Stanley Tool Impressed; the body sherds all appear to be assignable to the Stanley Braced Rim Ware. Each of the 29 sherds is decorated with a deep fine-line incising in the area between the base of the neck and the shoulder. The design elements are mainly a series of hatched triangles, and straight lines are always used. The decorated zone is occasionally bounded by a row of punctations at the break of the shoulder.

Component types:

Stanley Wavy Rim.
Stanley Cord Impressed.
Stanley Tool Impressed.
Stanley Plain.

STANLEY WAVY RIM

(Pl. 12)

(Type sample: 271 rim sherds)

Paste: See Stanley Braced Rim Ware.

Form: See Stanley Braced Rim Ware.

Handles: None.

Surface finish: Bodies, predominantly simple stamped. Necks, 56.1 percent brushed, 19.9 percent plain, 24.0 percent indeterminate.

Decoration: The rim treatment is very distinctive. It consists of a series of alternating indentations on the interior and the exterior, apparently made by pressing the plastic clay with the thumb and forefinger offset, one inside

and the other outside the vessel. This produced the indentations and gave the characteristic wavy or sinuous effect to the lip and rim when seen from above.

STANLEY CORD IMPRESSED

(Pl. 13)

(*Type sample: 118 rim sherds*)

Paste: See Stanley Braced Rim Ware.

Form: See Stanley Braced Rim Ware.

Handles: There are 9 strap handles and 12 lugs that can be definitely assigned to Stanley Cord Impressed. The strap handles extend from the bottom of the rim brace to approximately the junction of the neck and body of the vessel. The upper ends of the handles are blended into the flange of the rim brace; the lower ends are blended into the vessel wall. Neither end is riveted. The lugs are simple tabs drawn out from the bottom of the rim brace with the outer surface in the same plane as the outer surface of the rim brace. Occasional vessels have two pairs of lugs or handles, and both lugs and handles occur on the same vessel, lug opposite lug and handle opposite handle.

Surface finish: Bodies predominantly simple stamped. Necks, 51.7 percent brushed, 29.7 percent plain, 18.6 percent indeterminate.

Decoration:

All of the rims assigned to this type are braced, and all of the rim braces are decorated by a series of single cord impressions. Some of the impressions are horizontal. Others cross the rim brace diagonally, either from upper right to lower left or from upper left to lower right. The diagonal impressions sometimes carry over the lip onto the interior. Seven sherds (5.8 percent) have horizontal or diagonal cord impressions on the rim brace and horizontal cord impressions on the neck. The combinations of the various decorative treatments are tabulated below.

	Number	*Percent*
Horizontal cord impressed, plain interior	59	50.0
Horizontal cord impressed, diagonal impressed interior	28	23.7
Diagonal cord impressed, plain interior	18	15.3
Diagonal cord impressed, diagonal impressed interior	6	5.1
Horizontal cord-impressed rim and neck	5	4.2
Diagonal cord-impressed rim, horizontal cord impressed neck	2	1.7
Total	118	100.0

All the strap handles on cord-impressed rims are horizontally cord impressed. Most of the lugs are decorated with horizontal or diagonal cord impressions which are a continuation of the associated rim treatment. A few lugs on horizontally impressed rims are decorated with a series of concentric arcs.

STANLEY TOOL IMPRESSED

(Pl. 14)

(*Type sample: 148 rim sherds*)

Paste: See Stanley Braced Rim Ware.

Form: See Stanley Braced Rim Ware.

Handles: Four strap handles and five lugs can be definitely assigned to Stanley Tool Impressed. They are identical with those on Stanley Cord Impressed.

Surface finish: Bodies predominantly simple stamped. Necks, 50.7 percent brushed, 25.7 percent plain, 23.6 percent indeterminate.

Decoration:

All of the rims assigned to this type are braced, and all of them are decorated with a series of tool impressions. The great majority of the rims carry a series of diagonal incisions made with a sharp-pointed tool. The incisions run diagonally from the lower edge of the rim brace to the lip, and are often carried over the lip onto the interior. They run both from upper right to lower left, and from upper left to lower right. Although differing in technique, this treatment is very similar in appearance to the diagonal impressions on Stanley Cord Impressed. Another group of sherds are decorated with a series of punctate impressions made with a blunt-ended tool. Other variants include a series of horizontal incisions which encircled the rim brace to give an effect similar to the horizontal treatment on Stanley Cord Impressed; indentations at the lip or at the lip and the lower edge of the rim brace with an intervening plain area; herringbone incisions; and deep cuts through the rim brace which give a "spurred" effect. A single sherd carries a combination of a diagonally incised rim brace with horizontal incisions on the neck, and another a combination of horizontal and diagonal incisions on the brace. The occurrences of the various decorative treatments are tabulated below:

	Number	*Percent*
Diagonal incising, exterior and interior	61	41. 2
Diagonal incising, plain interior	49	33. 1
Impressed, plain interior	24	16. 2
Herringbone	5	3. 4
Horizontal incising	4	2. 7
Spurred	3	2. 1
Horizontal and diagonal incising	2	1. 3
Total	148	100. 0

Two of the four strap handles are decorated with horizontal incisions, and two with diagonal incisions. The lugs are either undecorated or are decorated with a continuation of the associated rim treatment.

STANLEY PLAIN

(Not illustrated)

(*Type sample: 45 rim sherds*)

Paste: See Stanley Braced Rim Ware.

Form: See Stanley Braced Rim Ware.

Handles: There are two lugs, both from the same vessel, which could be definitely assigned to Stanley Plain.

Surface finish: Bodies predominantly simple stamped. Necks, 73.2 percent brushed, 26.8 percent plain.

Decoration: None. All of the rims are braced, but they are otherwise unmodified.

Foreman S-Rim Ware

(Ware sample: part of 2,435 plain and 5,983 cord-roughened body sherds, 373 rim sherds)

Paste:

Tempering: Grit, diameters ranging from 0.5 to 2.5 mm. The appearance and composition of the tempering material is nearly identical with that of the Stanley Braced Rim Ware—apparently a decomposed granite represented by a mixture of subangular quartz fragments, mica, and some feldspar. On the basis of a megascopic comparison, mica seems to be somewhat more common in the Foreman types than in the Stanley Braced Rim types.

Texture: Medium to coarse. There is a tendency to a development of internal cleavages parallel to the vessel walls, but it is somewhat less common than in the Stanley Braced Rim.

Hardness: 2.5–4.0.

Color: Gray to yellowish tan. The majority of the external surfaces are use-blackened. Firing clouds occur on the interiors and the exteriors. Those on the interiors are comparatively rare, and are usually near the vessel rim.

Form:

Overall shape: Jars with high S-rims, rather sharp shoulders, and subconoidal to rounded bottoms.

Lip: Generally beveled inward. On a minority of the sherds assigned to each type within the ware, the lip is beveled and then everted by bending out the uppermost portion of the rim. The everted sections range up to 5 mm. in width.

Rim: All of the rims assigned to this ware are variants of an S-shaped cross section, with the bulge of the rim giving a collared effect to the vessel. The height of the bulge ranges from 30 to 60 mm. Although there are noticeable differences in the size and proportions of the individual sections, they all have a constriction at the vessel mouth, and a second constriction of the area in which the rim joins the body of the vessel. The entire rim is of approximately the same thickness as the vessel wall. On three sherds, an up-sloping flange has been welded onto the vessel wall at the base of the rim.

Neck: With the possible exception of the constriction at the base of the rim, there is no area in these vessels which can properly be called a neck.

Shoulder: Generally rather sharp, with a marked difference in the plane of the vessel wall above and below the shoulder.

Base: Rounded to subconoidal.

Surface finish: Most of the body areas are cord roughened, a finish which was presumably produced by pressing a cord-wrapped paddle against the vessel wall. The interiors are smoothed, but are otherwise unmodified.

Decoration: Varies with the individual types.

Component types:

Foreman Cord Impressed.

Foreman Incised.

Foreman Cord Impressed Triangle.
Foreman Incised Triangle.
Foreman Plain.

FOREMAN CORD IMPRESSED

(Pl. 15)

(*Dodd site sample: 288 rim sherds*)

Paste: See Foreman S-Rim Ware.
Form: See Foreman S-Rim Ware.
Handles: None.
Surface finish: Bodies predominantly cord roughened. However, several rim sherds carry relatively large plain body sections, which suggests that some of the vessels may have had plain exteriors.
Decoration: The primary decorative treatment is a series of from 3 to 12 horizontal cord impressions which were very evenly applied around the bulge of the S-rim. The majority of the sherds have no other decoration. However, on some 15 percent of the sherds, the cord-impressed band is bounded at the top or at the top and bottom by a series of indentations made with a pointed tool. On sherds with an everted lip, the upper series of indentations is confined to the everted section.

FOREMAN INCISED

(Pl. 16)

(*Dodd site sample: 69 rim sherds*)

Paste: See Foreman S-Rim Ware.
Form: See Foreman S-Rim Ware.
Handles: None.
Surface finish: Bodies predominantly cord roughened, although some undoubtedly had plain areas, and some may have had entirely plain exteriors.
Decoration: The most common decorative treatment is a series of from 3 to 9 horizontal incised lines which encircle the bulge of the vessel rim. Some 17 percent of the sherds carry a row of punctations above or above and below the incised band. On two sherds from the same vessel, there is a narrow crosshatched band between the horizontal incisions and the lip. On three sherds, the band of horizontal incising is replaced by a wide crosshatched zone bounded top and bottom by a single incised line. Two striking pieces have a band of diagonal incisions just below the lip, below which are two horizontal cord-impressed lines, two horizontal incised lines, a band of herringbone incisions, and finally a single row of punctations at the base of the rim.

FOREMAN PLAIN

(Not illustrated)

A single rim from the Dodd site is identical with the Foreman Incised and Cord Impressed, except that it is undecorated in any way.

FOREMAN CORD IMPRESSED TRIANGLE; FOREMAN INCISED TRIANGLE

These two types were described by Hurt on the basis of the material from the Swanson site (Hurt, 1951 b). They appear to be an integral part of the Swanson complex, but they are definitely in the minority at the Dodd site. There were only 12 sherds of Foreman Cord Impressed Triangle and 3 sherds of Foreman

Incised Triangle in the Dodd collection. These pieces, together with those described by Hurt, undoubtedly represent one variant within the Foreman S-Rim Ware. However, it is a decoration variant which seems to have been much more popular at the Swanson site than at the Dodd site.

Anderson Flared Rim Ware

(Ware sample: part of 2,435 plain and 5,983 cord-roughened body sherds, 464 rim sherds and no restored vessels)

Paste:

Tempering: Grit, diameters ranging from 0.5 to 2.5 mm. The tempering material is primarily subangular quartz fragments and mica, probably representing a decomposed granite. It is indistinguishable from that found in Stanley Braced Rim and Foreman S-Rim Wares. There may be somewhat more mica present than in the Stanley Braced Rim pieces.

Texture: Medium to coarse, with a tendency to develop internal cleavages parallel to the vessel wall.

Hardness: 2.5–4.0.

Color: Predominantly gray, some tans. The majority of the exteriors are blackened with a carbon incrustation.

Form:

Overall shape: Probably tends to globular bodies. Well-defined shoulder sometimes present.

Lip: Characterized by a broad bevel to the exterior.

Rim: Usually thicker than the vessel wall, flared sharply outward.

Shoulder: Usually absent.

Base: Probably rounded.

Surface finish: Vessel exteriors predominantly cord roughened, interiors smoothed.

Decoration: Varies with the individual types.

Component types:

Anderson High Rim.

Anderson Low Rim.

Note: At the time Hurt and the writer compared sherd samples, the Anderson Flared Rim material appeared to be identical with Hurt's Capitol Flared Rim. However, Hurt's category is much more inclusive. The Anderson material seems to correspond most closely to his "Subtype B: Maxon Flared Rim."

Anderson High Rim

(Pl. 17)

(Type sample: 361 rimsherds)

Paste: See Anderson Flared Rim Ware.

Form: See Anderson Flared Rim Ware. This type is distinguished by its rim form. The majority of the rims are straight in cross section, and are sharply everted. They are of the same thickness as, or slightly thicker than, the vessel wall. The exterior dimension from the lip to the neck-body junction ranges from 3.0 to 4.5 cm.

Handles: None.

Surface finish: Bodies are predominantly cord roughened, but with large plain areas and possibly some plain vessels.

Decoration: Some of the rims are undecorated in any way. The cord roughening of the body stops at the base of the rim, and the rim itself is smoothed on the

exterior and interior. The majority of the rims are decorated with a series of tool punctations at the junction of the lip bevel and the rim exterior. A few are decorated with incised crosshatching on the beveled lip. A very few sherds carry a series of cord impressions on the exterior of the rim, combined with punctations or an incised line on the lip bevel. Two sherds are decorated with a series of diagonal punctations just below the lip, and a combination of horizontal and diagonal incisions on the rim exterior.

	Number	*Percent*
Plain	86	23.8
Lip punctate	242	67.0
Crosshatched lip	19	5.3
Horizontal cord impressed rim	14	3.9
Total	361	100.0

Note: A number of rims collected at the Thomas Riggs site and at the Lower Cheyenne River village are indistinguishable in form and decoration from those characteristic of the Anderson High Rim. However, they were attached to simple-stamped bodies, and presumably should be assigned to another type.

ANDERSON LOW RIM

(Pl. 17)

(*Type sample: 103 rim sherds*)

Paste: See Anderson Flared Rim Ware.

Form:

See Anderson Flared Rim Ware. The rim is the distinguishing feature of this type. Rims are straight and sharply everted. They are generally markedly thicker than the vessel wall. The exterior dimension from the lip to the neck-body junction ranges up to 3.0 cm.

The two Anderson Flared Rim types are very similar except for the rim form. The High Rim type has a well defined rim which stands out as a distinct component of the vessel profile. The Low Rim pieces give the impression that the rim is a thickened and everted lip. There are some borderline cases which could fall into either category. An arbitrary division was made on an outside rim height of 3.0 cm.

Handles: None.

Surface finish: Cord-roughened body, but with extensive plain areas and possibly some plain vessels.

Decoration: The majority of the rims are undecorated in any way. Some are crosshatched on the lip bevel, and some are punctate either on the lip bevel or on the angle between the lip and the rim.

	Number	*Percent*
Plain	61	59.2
Lip punctate	20	19.4
Crosshatched lip	22	21.4
Total	103	100.0

Monroe Collared Rim

(Pl. 16)

(*Type sample: 32 rimsherds*)

Note: This type has not been placed within a ware. There might be some justification for assigning it to Foreman S-Rim. There are, however, enough differences to make this unwise on the basis of the available data. The Monroe Collared Rim bodies apparently tend to be more globular and to lack the distinct shoulder; the rims are generally lower; and the thickening within the Monroe collars is either extremely rare or absent in the Foreman S-Rim pieces at the Dodd site. The S-Rim types also seem to be somewhat better made on the whole, and they appear to be later at the Dodd site than the Monroe Collared Rim.

Paste:

Tempering: Grit, diameters ranging from 0.5 to 2.5 mm. The appearance and composition (quartz, mica, and some feldspar) suggest that the tempering material is a decomposed granite.

Texture: Medium to coarse. Several sherds show a series of exfoliations from the exterior surface, presumably the effect of firing upon some inclusion in the paste.

Hardness: 2.5–3.5.

Color: Light to medium gray, with exterior surfaces generally heavily carboned.

Form:

Overall shape: Jars with collared rims and rather globular bodies.

Lip: Slightly rounded.

Rim: There are two rim forms, both having the same appearance from the exterior. They are characterized by collars from 22 to 35 mm. high. On slightly more than half of the sherds in the sample, the interior wall of the rim follows the exterior curve of the collar in something very much like an S-rim. On the other sherds the collar was produced by thickening the rim so that the interior and exterior profiles are entirely different.

Neck: Except for the narrow constricted zone below the rim, there is nothing which can be properly called a neck.

Shoulder: Absent.

Base: Probably rounded.

Surface finish: The bodies appear to have been either cord roughened or plain.

Decoration: The decoration is confined to the rim and consists of a series of rather narrow incised triangles filled with horizontal incisions. The triangles are pendent from a single or double incised line encircling the rim just below the lip. On a few sherds there is a band of punctations between the lip and the horizontal line. A horizontal incised line is sometimes present at the base of the rim, bounding the bottom of the decorated area.

Miscellaneous and Unidentifiable

There are 147 rim sherds in the Dodd site collection which are so fragmentary or so lacking in distinguishing characteristics that it has been impossible to classify them. There are a number of other sherds which do not conform to the types described above. These latter

pieces have been listed as "miscellaneous" in the sherd counts. The most distinctive ones have been illustrated in plate 17.

Seventeen rim sherds in the Dodd site collection were originally classified as a variant of Stanley Wavy Rim (Lehmer, 1951, ftn. 1). On the basis of Smith's subsequent description of the pottery from the Talking Crow site (Smith, 1951), it appears that these sherds are representatives of Talking Crow Brushed, one of the types which Smith has established for the late horizon in the upper Fort Randall Reservoir. The 17 Talking Crow sherds found at the Dodd site are presumably intrusives from the Fort Randall area. Taken in conjunction with the occurrence of small amounts of the Stanley types at Talking Crow, this would appear to indicate at least partial contemporaneity of the Stanley and Talking Crow pottery types.

Twenty-six of the miscellaneous sherds from the Dodd site belong to four of the types which were described by Hurt on the basis of his work at the Swanson site during the same year that the Dodd site was excavated (Hurt, 1951 b). Two of these types, the Foreman Cord Impressed Triangle and the Foreman Incised Triangle, fall within the range of the Foreman S-Rim Ware which is well represented at the Dodd site by the Foreman Incised and Cord Impressed types. The other two of Hurt's types, Mitchell Incised and Mitchell Broad Trailed, stand apart from the rest of the Dodd site pottery, and appear to represent a ceramic tradition which is foreign to the Oahe area. These four types are present in the collection in the following quantities:

Foreman Cord Impressed Triangle	12
Foreman Incised Triangle	3
Mitchell Broad Trailed	5
Mitchell Incised	6

The Dodd site collection also included one partly restorable Mitchell Broad Trailed vessel (pl. 19). It has a loop handle, and is particularly interesting because the decoration includes a repeated motif which appears to be a variant of the "weeping eye" design.

One other partly restorable vessel also carried a broad-trailed design. The form and decoration of the rim were indistinguishable from the Capitol High Rim pieces; the body was polished over simple stamping.

Two other sherds in the miscellaneous group (pl. 16, *m*, *n*) deserve special mention. They stand distinctly apart from the rest of the Dodd site pottery, since they appear to represent the Woodland tradition. Both sherds are very similar to a number of pieces illustrated by Hill and Kivet (Hill and Kivet, 1940). The temper consists of rounded to subangular quartz fragments and a little mica. It is much sparser than the tempering in the other Dodd site sherds.

Hardness is approximately 4.0. The surface color is a grayish tan, but it extends for only a millimeter or less into the dense black core of the vessel wall. Both sherds appear to have come from more or less straight-sided jars. The lips are flat, the rims slightly thickened, one on the exterior and the other on the interior. Both sherds are finished with vertical cord roughening on the exterior; the interior has horizontal striations which may be due either to brushing or to a partly obliterated cord roughening. Each of the sherds has a single circular punctation on the exterior some 5 mm. in diameter and 20 mm. below the rim.

A single painted or slipped sherd was found. Through a hand lens, the temper appears to be identical with that found in the rest of the pottery at the site. The paste is considerably more compact. The piece is a body sherd, the interior roughly smoothed, the exterior smoothed but not polished. About two-thirds of the exterior surface is covered with a light-red paint or slip which is not water soluble. The untreated area is a yellowish tan color.

Miniature Vessel

(1 specimen)

A fragment of a miniature bowl 38 mm. in diameter and approximately 25 mm. deep; hemispherical with incurved lip; a pair of small holes through the wall just below the lip, probably a second pair opposite them.

Pottery Disks

(16 specimens)

Roughly circular unperforated disks with ground edges; made from cord-roughened, plain, and one simple-stamped body sherd.

Diameter: Mean, 3.0 mm., range 2.2 to 3.8 mm.

ARTIFACTS OTHER THAN POTTERY

Pottery is pottery, and it can be described as such. There are two conventional ways of organizing the descriptions of other classes of artifacts. One is a functional grouping in which, for example, all objects considered to have been used as knives are grouped together, regardless of material or method of manufacture. The more common treatment is one which presents together all the objects made from one general category of material, with major subdivisions based on the method of manufacture, and minor ones on the basis of a functional interpretation. The latter plan has been followed in the descriptive text in order to have a more or less empirical categorization of the material. The number of specimens for each major category is given below the section heading; the number of specimens for the subcate-

gory follows the group designation. In a later section, and in the plates, an attempt has been made to draw together all of those pieces which the writer believes fulfilled the same function. This is done with a full awareness that functions attributed to items of an alien culture may be completely erroneous. However, without some such attempt, archeology must remain a skeleton of artifacts with no covering in the form of an integration of those artifacts into the daily lives of their makers.

Chipped Stone

A variety of different kinds of stone was used as the raw material for the manufacture of the chipped-stone artifacts. Some are common in the vicinity of the Dodd site, others appear to have been imported.

ARROW POINTS

(138 specimens)

The small, light, pressure-flaked projectile points in the Dodd site collection were almost certainly hafted to arrows. Five basic styles are represented, along with the inevitable scattering of deviants.

Group 1 (fig. 23); 25 specimens.

Side-notched, straight-sided triangular, maximum width at base, straight base; slightly concave or convex bases occur rarely. The notches are at right angles to the long axis, and are often very narrow.

Length: Mean 26 mm., range 20 to 30 mm.
Width: Mean 14 mm., range 10 to 17 mm.
Weight: Mean 1.1 gm., range 0.9 to 2.0 gm.

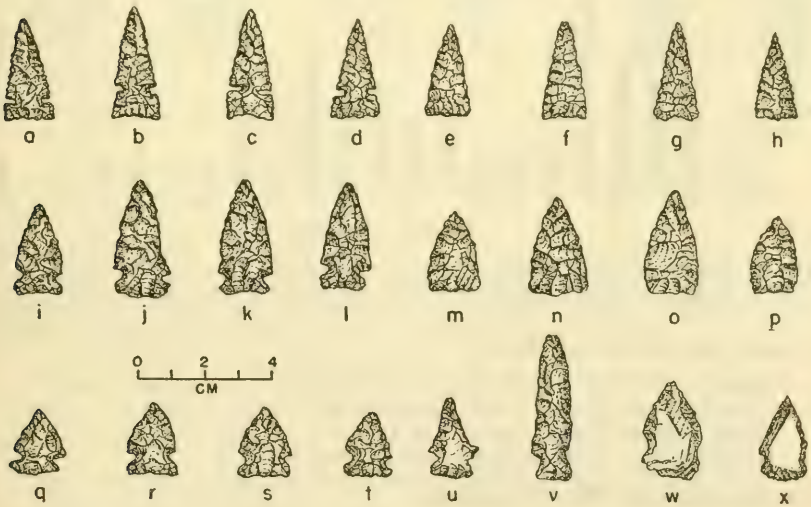

FIGURE 23.—Arrow points, Dodd site. *a–d*, Group 1; *e–h*, Group 2; *i–l*, Group 4; *m–p*, Group 5; *q–t*, Group 3; *u–x*, miscellaneous.

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Group 2 (fig. 23); 21 specimens.

Triangular with straight or slightly concave edges, straight or concave bases. Maximum width at base.

Length: Mean 25 mm., range 19 to 35 mm.
Width: Mean 15 mm., range 12 to 17 mm.
Weight: Mean 1.1 gm., range 0.7 to 1.5 gm.

Group 3 (fig. 23); 28 specimens.

Expanded stem, leaf-shaped blade with a tendency to irregular edges, slightly concave, straight, or slightly convex base.

Length: Mean 20 mm., range 16 to 23 mm.
Width: Mean 14 mm., range 13 to 18 mm.
Weight: Mean 1.0 gm., range 0.6 to 1.6 gm.

Group 4 (fig. 23); 30 specimens.

Expanded stem, leaf-shaped blade with a tendency to irregular edges, slightly concave to straight base. Maximum width usually at shoulder, but may be across base.

Length: Mean 29 mm., range 24 to 38 mm.
Width: Mean 15 mm., range 13 to 17 mm.
Weight: Mean 1.6 gm., range 1.0 to 2.1 gm.

Note: Groups 3 and 4 are distinguished on the basis of the overall point length. There is a total range from 16 to 38 mm. for the two groups. However, when the lengths of the individual points are plotted, a bimodal curve results (fig. 24) which seems to justify a division between those points 23 mm. or less in length and those 24 mm. or more in length.

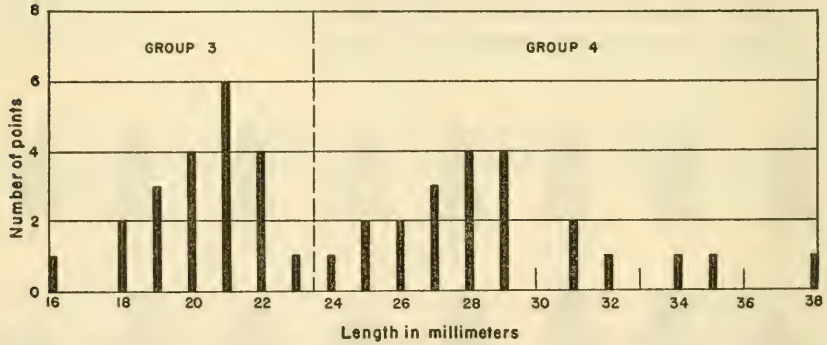

FIGURE 24.—Arrow-point lengths, Groups 3 and 4, Dodd site. (Note: Only the 43 unbroken points of the 58 assigned to Groups 3 and 4 are represented here.)

Group 5 (fig. 23); 21 specimens.

Truncated leaf-shaped blade with a straight base.

Length: Mean 25 mm., range 20 to 33 mm.
Width: Mean 16 mm., range 13 to 31 mm.
Weight: Mean 1.7 gm., range 0.9 to 2.5 gm.

Miscellaneous (fig. 23); 13 specimens.

Thirteen of the points which were complete enough to permit identification did not fit into any of the five basic groups. Three of them deserve special mention. They were wide relative to the length, and in form and proportion were very

similar to the points assigned to Group 3. However, they were considerably larger, lengths ranging from 25 to 29 mm., widths from 18 to 20 mm.

DRILLS

(20 specimens)

Group 1 (fig. 25); 5 specimens.

Narrow, tapered, pressure-flaked blades with markedly expanded base areas. The base was wide enough to allow for use key-fashion without hafting. One piece (fig. 25, *c*) had one distinct side notch, but the drill itself had probably been worked down from a stemmed knife.

Length: Mean 38 mm., range 30 to 46 mm.
Maximum blade width: Mean 10 mm., range 7 to 13 mm.
Maximum base width: Mean 19 mm., range 15 to 24 mm.

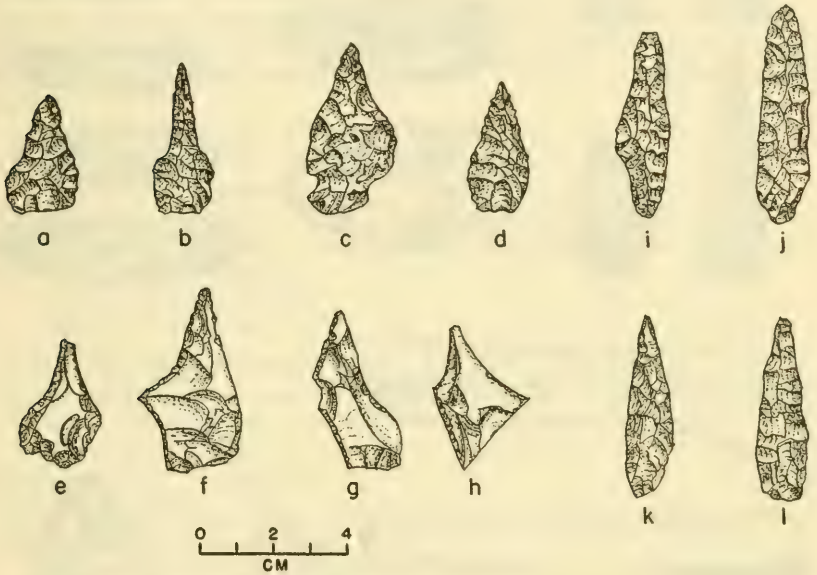

FIGURE 25.—Drills, Dodd site. *a–d*, Group 1; *e–h*, Group 3; *i–l*, Group 2.

Group 2 (fig. 25); 7 specimens.

Narrow, elongate, pressure-flaked pieces without expanded bases; blades unusually thick in proportion to their width. These pieces are very similar to some of the so-called ensiform drills of the Southeastern United States.

Length: Mean 54 mm., range 49 to 58 mm.
Width: Mean 13 mm., range 13 to 14 mm.
Thickness: Mean 8 mm., range 7 to 10 mm.

Group 3 (fig. 25); 8 specimens.

Thin flakes with a broad, little retouched base and a long tapering point.

Overall length: Mean 43 mm., range 37 to 48 mm.
Maximum blade width: Mean 13 mm., range 8 to 13 mm.
Maximum base width: Mean 28 mm., range 25 to 30 mm.

STEMMED KNIVES

(7 specimens)

Group 1 (fig. 26); 3 specimens.

Side-notched, leaf-shaped blade, flat base, maximum width at base of blade.

Lengths: 64 and 63 mm.

Widths: 31, 29, and 28 mm.

Weights: 11.2 and 17.6 gm.

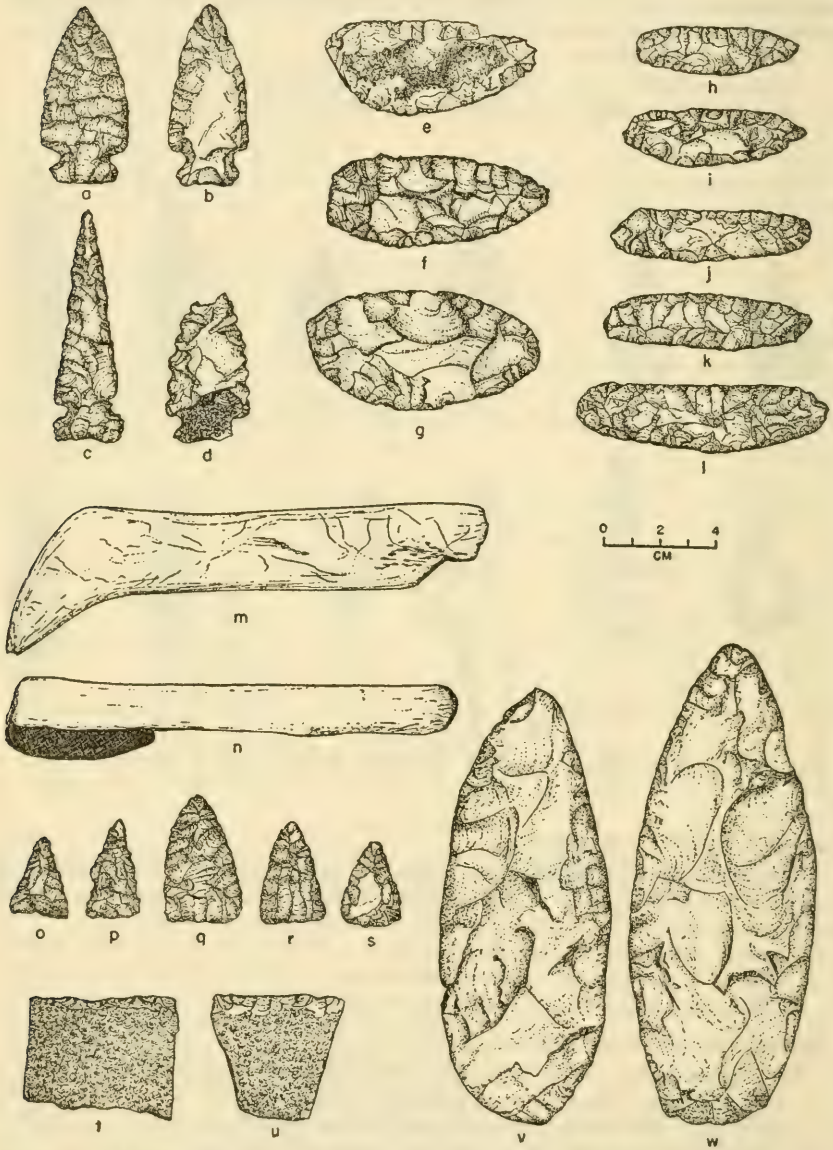

FIGURE 26.—Knives, Dodd site. *a, b,* Stemmed knives, Group 1; *c, d,* Group 2; *e–g,* knives, Group 2; *h–l,* Group 1; *m,* scapula knife; *n,* iron blade in bone handle; *o–s,* Group 4; *t, u,* Group 5; *v, w,* Group 3.

Group 2 (fig. 26) ; 4 specimens.

Miscellaneous forms including one long, straight-sided, side-notched, triangular form; one side-notched piece with leaf-shaped blade with heavily serrated edges, and two rather crude side-notched pieces.

KNIVES

(57 specimens)

Group 1 (fig. 26); 24 specimens.

Long, narrow, carefully flaked asymmetrical "leaf" blades. One edge tends to be straight while the other is decidely convex. Several pieces show definite signs of use on the convex edge. The dimensions of nine complete pieces are:

Length: Mean 66 mm., range 45 to 90 mm.

Maximum width: Mean 19 mm., range 14 to 23 mm.

Group 2 (fig. 26); 8 specimens.

Broad, carefully flaked asymmetrical "leaf" blades. One edge tends to be straight, the other decidedly convex. Similar to Group 1, except for the markedly greater width in proportion to the length. The dimensions of four complete pieces are:

Length: Mean 84 mm., range 75 to 103 mm.

Maximum width: Mean 39 mm., range 32 to 50 mm.

Group 3 (fig. 26); 3 specimens.

Large symmetrical leaf-shaped blades, percussion flaked with pressure retouch. One edge usually blunted, suggesting use without hafting. The dimensions of two complete specimens are:

Lengths: 174 and 157 mm.

Widths: 67 and 62 mm.

Group 4 (fig. 26); 16 specimens.

Crude triangular to convex-sided triangular with flat to slightly convex bases.

Length: Mean 33 mm., range 25 to 45 mm.

Maximum width: Mean 22 mm., range 18 to 28 mm.

Group 5 (fig. 26); 6 specimens.

Chalcedony or milky quartz plates broken into roughly geometrical forms, one edge sharpened by pressure flaking.

Blade length: Mean 47 mm., range 37 to 60 mm.

Width: Mean 38 mm., range 26 to 47 mm.

END SCRAPERS

(342 specimens)

The chipped tools which have been classified as scrapers were the most common artifacts at the Dodd site. There was a considerable variation within the entire category, and within the individual groups described below. These groups should not be considered as rigidly defined types, but rather as clusters around a mode or an ideal. There are also the inevitable pieces which balance hesitantly between two groups, awaiting the impatient shove which assigns them to one or the other.

All of the end scrapers were planoconvex tools. The plane surface was almost always a single flake scar resulting from the blow which

detached the piece from the parent nodule. The bulb of percussion was always at the end opposite the cutting edge. On more than half of the scrapers, the plane surface was unmodified in any way. When a particularly large bulb of percussion was present, a few small flakes were taken off to reduce the size of the bulb.

Groups 1 through 3 include the markedly convex pieces which are usually referred to as "snub-nose" scrapers; Groups 4 and 5 include those which are the thinner ones commonly called "thumb-nail" scrapers.

Group 1 (fig. 27); 77 specimens.

Comparatively small, well-made, symmetrical pieces, roughly triangular; triangular cross section; maximum thickness adjoins the cutting end. Pressure flaked over entire convex surface except for a few instances in which part of the outer surface of the original nodule conformed to the general shape of the tool; flakes removed more or less at right angles to long axis. Cutting edge tends to be straight with curved ends.

Length: Mean 29 mm., range 20 to 45 mm.
Width: Mean 22 mm., range 16 to 29 mm.
Thickness: Mean 7 mm., range 5 to 12 mm.

Group 2 (fig. 27); 53 specimens.

Similar to Group 1, except for a definite asymmetry which throws more than half of the cutting edge to one side or the other of the long axis. Intersection of the long side and the cutting edge tends to be a sharp corner.

Length: Mean 24 mm., range 17 to 34 mm.
Width: Mean 22 mm., range 16 to 25 mm.
Thickness: Mean 7 mm., range 3 to 9 mm.

Group 3 (fig. 27); 83 specimens.

Comparatively large, irregular outline, more or less triangular cross section with maximum thickness adjacent to cutting edge. Convex surface percussion flaked with flakes generally parallel to long axis; cutting edge carefully prepared by pressure flaking.

Length: Mean 36 mm., range 24 to 54 mm.
Width: Mean 25 mm., range 15 to 40 mm.
Thickness: Mean 10 mm., range 6 to 14 mm.

Group 4 (fig. 27); 84 specimens.

Comparatively small pieces, more or less regular outline, made on flakes with the upper surface consisting of two or more large flake scars. Sides retouched and cutting edges formed by careful pressure flaking.

Length: Mean 26 mm., range 16 to 38 mm.
Width: Mean 21 mm., range 16 to 28 mm.
Thickness: Mean 5 mm., range 3 to 8 mm.

Group 5 (fig. 27); 45 specimens.

Comparatively large, irregular outline, upper surface consisting of two or more large flake scars. Sides seldom retouched, cutting edges formed by pressure flaking.

Length: Mean 32 mm., range 20 to 56 mm.
Width: Mean 24 mm., range 18 to 36 mm.
Thickness: Mean 7 mm., range 3 to 11 mm.

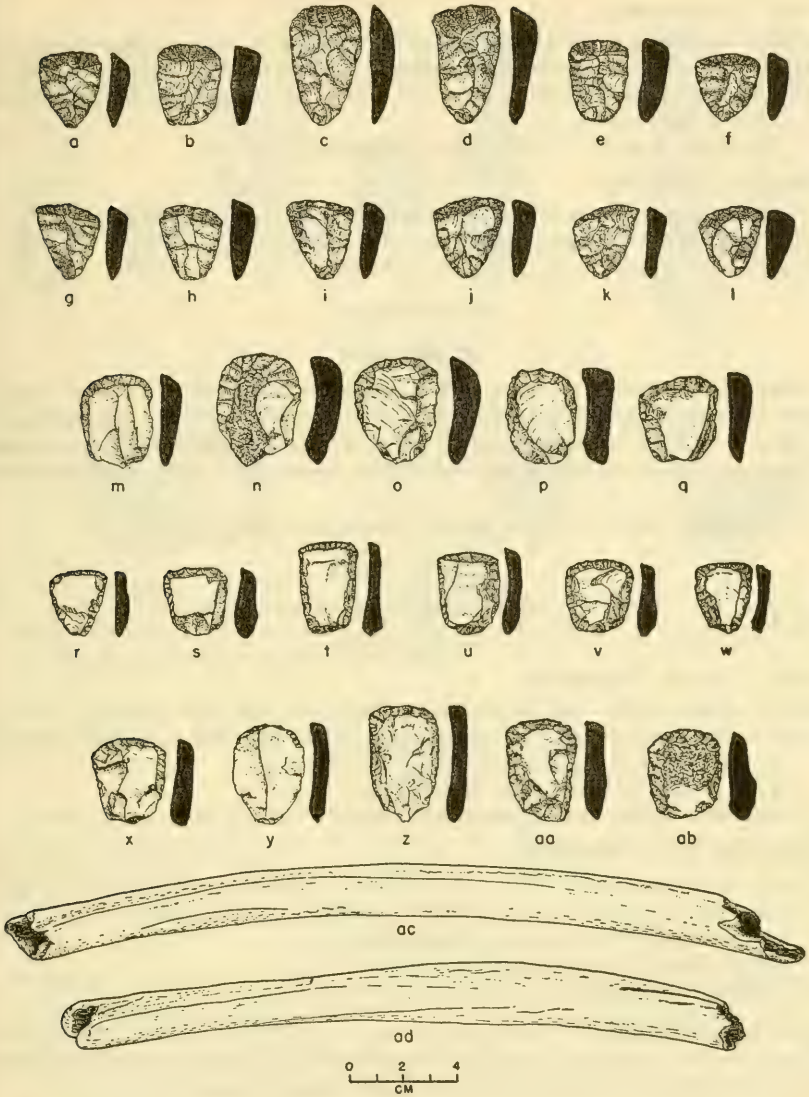

FIGURE 27.—End scrapers, Dodd site. *a–f*, Group 1; *g–l*, Group 2; *m–q*, Group 3; *r–w*, Group 4; *x–ab*, Group 5; *ac*, *ad*, scraper handles.

HAMMERSTONES

(11 specimens)

Group 1; 2 specimens.

Heavily battered, roughly spherical nodules.

Maximum diameters: 73 and 64 mm.

Group 2; 5 specimens.

Ovoid waterworn cobbles with pecking on the ends or along an edge if an edge is present. The pecked rather than battered surfaces seem to indicate that these pieces were not used on another stone but against some resilient material such as the end of a bone punch.

Maximum diameters: Mean 77 mm., range 60 to 102 mm.

Group 3; 4 specimens.

Long, irregular waterworn cobbles with pecked but not battered ends.

Length: Mean 120 mm., range 110 to 132 mm.

Diameter: Mean 53 mm., range 43 to 62 mm.

LARGE BLANKS

(*18 specimens*)

Roughly oval plates of stone with heavy percussion flaking on both faces. Apparently brought into the village as raw material for making stone artifacts. A number of these pieces were found together in cache pockets in house floors where they were often associated with smaller pieces which have been classified as flakes.

Maximum diameters: Mean 90 mm., range 50 to 225 mm.

Ground Stone

ARROW-SHAFT SMOOTHERS

(*21 specimens*)

Group 1 (fig. 28); 7 specimens.

Small, short, partly shaped pieces of sandstone with one grooved surface; groove runs down long axis; grooved surface ranges from flat to slightly convex.

Length: Mean 44 mm., range 37 to 54 mm.

Width: Mean 32 mm., range 26 to 42 mm.

Thickness: Mean 16 mm., range 24 to 28 mm.

Group 2 (fig. 28); 5 specimens.

Fairly large bun-shaped pieces, with either two flat faces or one flat and one markedly convex surface, grooved on flat surface down long axis.

Length: Mean 97 mm., range 93 to 99 mm.

Width: Mean 56 mm., range 54 to 64 mm.

Thickness: Mean 29 mm., range 21 to 35 mm.

Group 3 (fig. 28); 9 specimens.

Long, narrow sandstone pieces, well shaped with a convex surface, and a flat surface grooved along the long axis. Probably used in pairs.

Length: Single whole specimen, 158 mm.

Width: Mean 39 mm., range 33 to 45 mm.

Thickness: Mean 20 mm., range 12 to 28 mm.

SHARPENING STONES

(Fig. 28)

(*11 specimens*)

A series of irregular pieces of sandstone and scoria marked with one or more grooves of varying width and depth, apparently used for sharpening pointed bone tools.

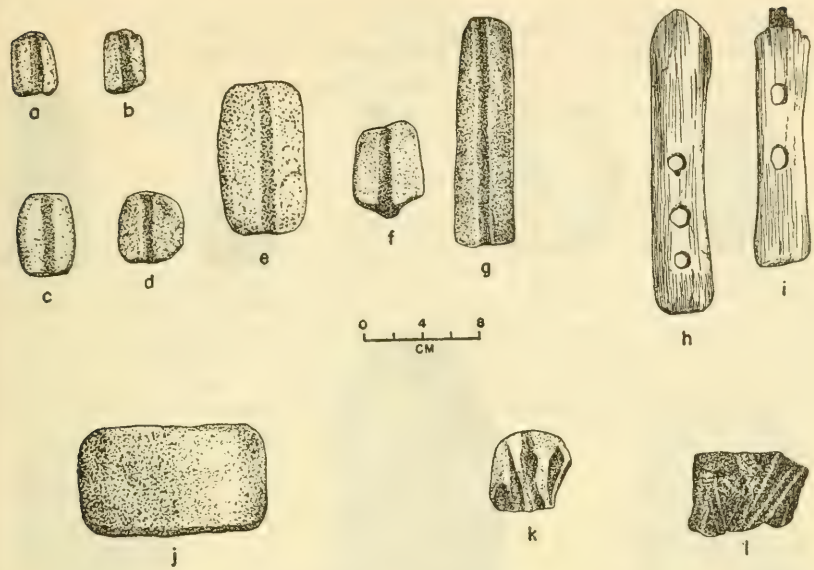

FIGURE 28.—Arrow-shaft smoothers, arrow-shaft wrenches, whetstone, and sharpening stones, Dodd site. *a–d*, Shaft smoothers, Group 1; *e*, Group 2; *f*, *g*, Group 3; *h*, *i*, shaft wrenches; *j*, whetstone; *k*, *l*, sharpening stones.

WHETSTONES

(Fig. 28)

(*2 specimens*)

A rectangular sandstone slab with rounded corners, 78 by 128 mm. and 17 mm. thick, and a fragment of a similar piece. One surface somewhat uneven, but worn smooth as if by use as some sort of "whetstone."

RUBBING STONES

(*13 specimens*)

Waterworn pebbles and cobbles with one flattish surface showing a moderate to high polish. The polished surfaces tend to be uneven, suggesting use against a resilient material rather than against another stone. The edges are frequently pecked, indicating secondary use as hammerstones.

Maximum diameters: Mean 78 mm., range 58 to 102 mm.

Maximum thickness: Mean 45 mm., range 33 to 70 mm.

MAULS

(Fig. 29)

(*10 specimens*)

Full-grooved; ends vary from blunt through rounded to blunt-pointed; cross sections vary from triangular with rounded corners through circular to irregular. Apparently made from cobbles which were naturally more or less the desired shape. In two cases the cobbles were unaltered except for the addition of the pecked and ground groove. The other eight pieces had been shaped by pecking over part or all of the surface.

Maximum length: Mean 134 mm., range 115 to 165 mm.
Maximum diameter: Mean 106 mm., range 88 to 124 mm.

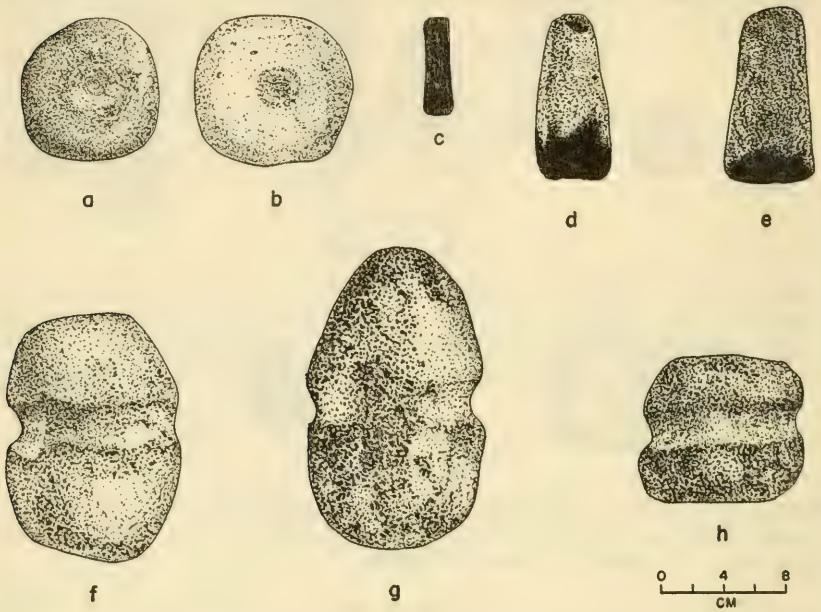

FIGURE 29.—Pitted handstones, celts, and mauls, Dodd site. *a*, *b*, Pitted handstones; *c*, iron chisel; *d*, *e*, celts; *f–h*, mauls.

CELTS

(Fig. 29)

(*6 specimens*)

Long, maximum width just behind blade, tapered to the blunt end; well shaped by pecking on the body, blade polished, polls battered.

Maximum length: Mean ? , range 98 to ? mm.

Maximum diameter: Mean ? , range 45 to ? mm.

Note: Dimensions are based on the two unbroken specimens in the group. The four fragments were from larger pieces. Maximum length is over 130 mm.; maximum diameter over 80 mm.

PITTED HANDSTONES

(Fig. 29)

(*2 specimens*)

Roughly circular with two opposed flat faces, shallow pits in the opposing faces. The edges are not battered, indicating that these pieces were used for pounding a resilient substance such as dried meat during the manufacture of pemmican. The pitted faces show no evidence of use as grinding tools.

Maximum diameters: 86 and 96 mm.

Maximum thickness: 50 and 58 mm.

PIPES

(*1 specimen*)

Represented by a single fragment which apparently came from the bowl of a catlinite elbow pipe.

GRINDING TOOLS

(*No specimen*)

Except for the rubbing stones described above, there were no stone artifacts found at the Dodd site which could be classified as grinding tools. The charred corn found shows that the economy was partly horticultural, and the corn was presumably ground in some way. The absence of any stone tools for this purpose suggests that the grinding was done with wooden mortars and pestles as it was done by the historic tribes of the area. In the circular houses, there was often a large hole in the floor, more or less in line between the firepit and the entrance. This hole was in the general position in which a wooden mortar was set in some of the historic earth lodges of the northern Plains.

Bone and Horn

HOES

(*52 specimens*)

Group 1 (fig. 30); 24 specimens.

Bison scapulae with scapular spine and ridge on the posterior border partly to completely removed; cutting edge may be rounded or square; glenoid cavity unmodified except for occasional working down of the edges. Occasionally there are more or less circular worn areas on the costal surface of the neck which seem to be the result of the end of the handle rubbing against the surface of the bone.

Group 2 (fig. 30); 27 specimens.

Bison scapulae with scapular spine and the ridge on the posterior border partly to completely removed; cutting edge may be rounded or square. All of these pieces have been chopped through at the neck so as to remove the glenoid cavity. There are occasionally more or less circular worn areas on the costal surface of the neck which seem to be the result of the end of the handle rubbing against the surface of the bone.

Group. 3 (fig. 30); 1 specimen.

Made from the nasal bones and the adjacent parts of the frontals of a bison skull. The ends of the nasal bones were worked down to the cutting edge. The narrowing of the piece across the frontal bones suggests that it may have been used without a handle.

HORN SCOOPS

(*6 specimens*)

Made from the base of a bison horn and the adjacent part of the frontal bone which was cut to shape and sharpened to a working edge. The working edge generally has a high polish, which may indicate use as a hoe.

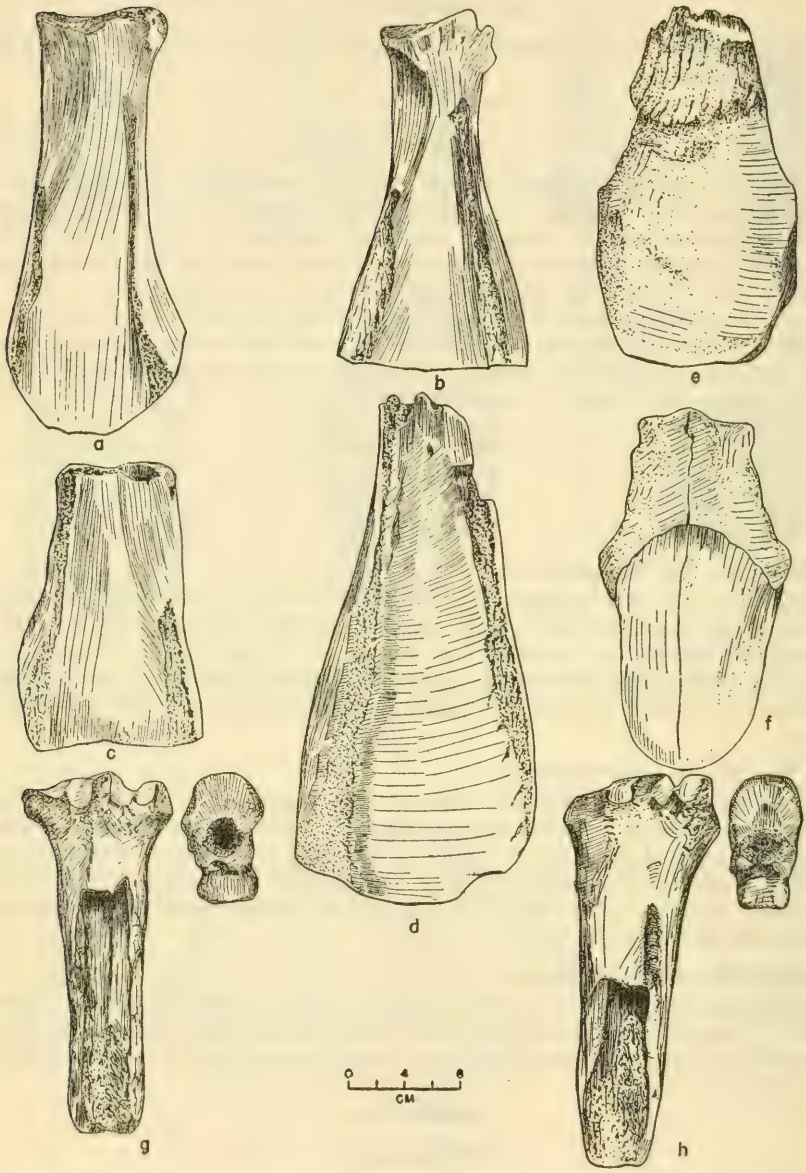

FIGURE 30.—Hoes, horn scoop, and picks, Dodd site. *a*, *b*, Hoes, Group 1; *c*, *d*, Group 2; *f*, Group 3; *e*, Horn scoop; *g*, *h*, picks.

PICKS

(Fig. 30)

(*4 specimens*)

Made by cutting away part of the shaft of a bison radius leaving the proximal end intact. The shaft of the bone was sharpened to a chisel edge. Two of the specimens had holes up to 20 mm. in diameter drilled through the articular surface and into the marrow cavity; the other two had well-defined circular indentations in the same place. These seem to indicate that these tools were hafted to a handle that was an extension of the long axis of the tool; fundamentally a bone-shod digging stick.

Lengths: Mean 272 mm., range 260 to 284 mm.

AWLS

(*88 specimens*)

Group 1 (fig. 31); 41 specimens.

Made from the sides of the ventral ends of bison ribs. The cancellous tissue is sometimes altered only slightly, sometimes ground almost completely away. Butts rounded, blades tend to be wide with smoothed edges, tips contract sharply to a point. A single piece had eight incisions across the edge midway between tip and butt.

Length: Mean 110 mm., range 63 to 303 mm.

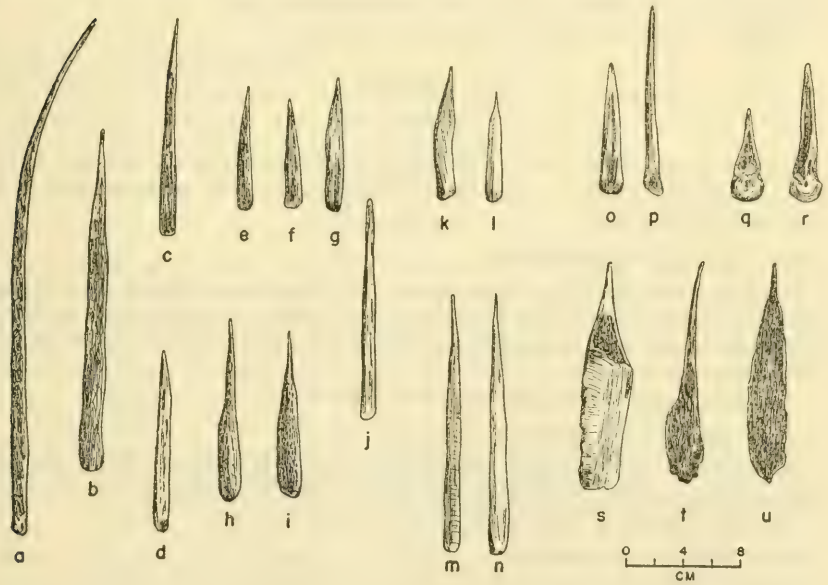

FIGURE 31.—Bone awls, Dodd site. *a–i*, Group 1; *j–n*, Group 2; *o*, *p*, Group 4; *q*, *r*, Group 5; *s–u*, Group 6.

Group 2 (fig. 31); 5 specimens.

Made from the edges of bison ribs, usually cut so as to include some of the cancellous tissue. Being cut from this part of the bone, these pieces have a circular to triangular cross section rather than the flat one characteristic of Group 1.

Length: Mean 128 mm., range 88 to 156 mm.

Group 3; 24 specimens.

Made from splinters from the shaft of the long bones of some large species of animal. Some of the cross sections tend to be round, but the majority are flattened with proportions that approach those of Group 1. A single piece had 4 parallel incised lines across the end near the butt.

Length: Mean 103 mm., range 71 to 177 mm.

Group 4 (fig. 31); 8 specimens.

Split from the proximal ends of deer or antelope metapodials, articular surface ground down, but serves as the butt of the awl.

Length: Mean 87 mm., range 64 to 131 mm.

Group 5 (fig. 31); 2 specimens.

Made from the lower part of the shaft and the distal end of deer or antelope metapodials. The articular surface was unmodified except for a slight polish apparently resulting from use.

Lengths: 57 and ca. 99 mm.

Group 6 (fig. 31); 8 specimens.

Made from rough irregular splinters of bison ribs and long bones, unworked except for the tip which is ground to a smooth sharp point.

Length: Mean 134 mm., range 81 to 185 mm.

PUNCHES

(75 specimens)

A series of tools which are all characterized by a blunt point in contrast to the sharp points of the awls. It seems likely that the majority of these pieces were used for flaking stone.

Group 1 (fig. 32); 42 specimens.

Irregular plates split from bison or elk ribs, cancellous tissue of split surface sometimes ground down, sometimes unmodified; edges unmodified; butts rounded; tips worked down to a blunt point. The following dimensions are based on five unbroken pieces.

Length: Mean 162 mm., range 122 to 220 mm.

Group 2 (fig. 32); 21 specimens.

Similar to Group 1, but made from long bones of large animals. Edges unmodified, butts unmodified or rounded, tips worked down to a blunt point.

Length: Mean 137 mm., range 73 to 193 mm.

Group 3 (fig. 32); 8 specimens.

Slivers of bone well shaped on all surfaces, worked down to a blunt tip. Butt of single whole specimen tapered to a flat end. There is some possibility that some of the broken pieces assigned to this group are the butt ends of Group 3 awls, but the ends, while blunt, are definitely more pointed than the awl butts.

Length of single whole specimen: 55 mm. Others appear to have been longer.

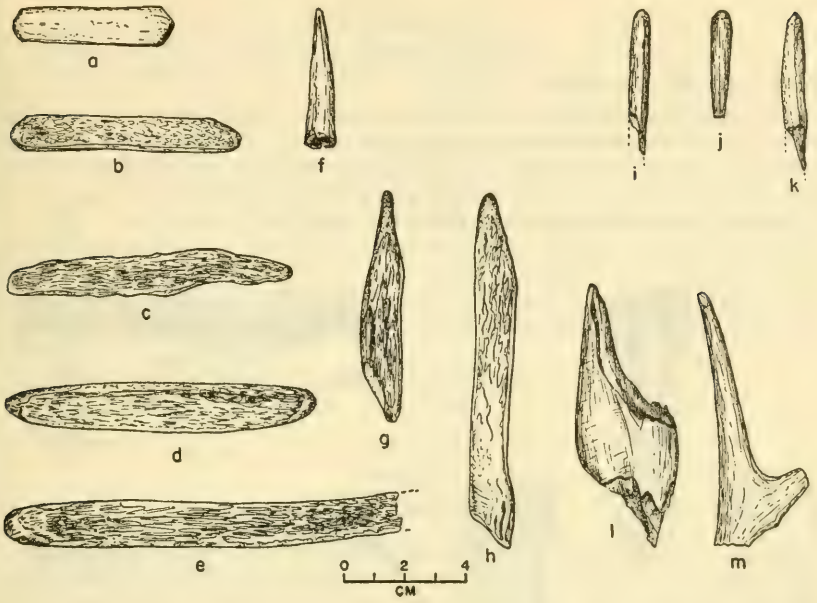

FIGURE 32.—Quill flatteners, snow snake, and punches, Dodd site. *a–e*, Quill flatteners; *f*, snow snake; *g*, *h*, punches, Group 1; *i–k*, Group 3; *l*, Group 2; *m*, Group 4.

Group 4 (fig. 32); 4 specimens.

Made from ends of deer antler prongs, the end showing definite signs of sharpening in several instances.

QUILL FLATTENERS

(Fig. 32)

(89 specimens)

Split segments of bison ribs with polished rounded ends, edges range from straight and smoothed to rough and irregular; cancellous tissue of split surface sometimes left rough, sometimes almost obliterated by smoothing. One piece carries a simple incised decoration on the external surface of the bone. Lengths range from 71 mm. to well over 200 mm. Since all of the larger pieces were broken, it was impossible to determine a mean or a maximum length.

Width: Mean 19 mm., range 11 to 24 mm.

Note: There is considerable variation in the finish of the edges and in the degree to which the cancellous tissue of the split surface is polished down. The consistent feature is the rounding and polishing of the ends. In general form, these pieces are very similar to a number in the ethnographic collections of the Chicago Natural History Museum. The Chicago specimens were collected from the Pawnee by George A. Dorsey who identified them as "quill planes." Lacking any better suggestion for the function of the Dodd site pieces, it seems reasonable to assume that they too were used for flattening porcupine quills which were to be used as decorative elements.

FLESHERS

(*10 specimens*)

Group 1 (fig. 33); 7 specimens.

Made by cutting the shaft of a bison metatarsal diagonally so as to produce a chisel edge which was sometimes slightly serrated. The proximal end of the bone was left intact as a handle. It seems highly probable that, in at least some cases, the tarsal bones were left articulated to provide additional leverage.

Length: Mean 166 mm., range 154 to 176 mm.

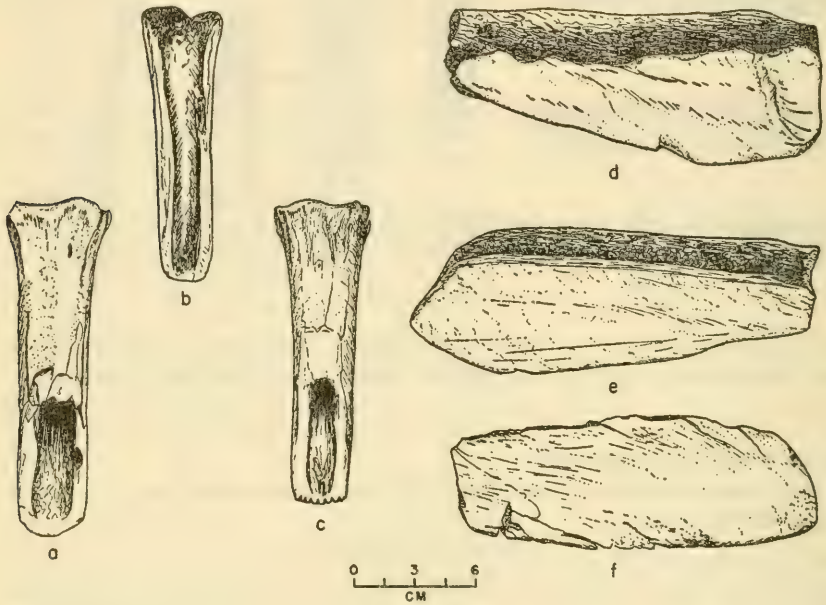

FIGURE 33.—Fleshers and scapula scrapers, Dodd site. *a*, *c*, Fleshers, Group 1; *b*, Group 2; *d–f*, scapula scrapers.

Group 2 (fig. 33); 3 specimens.

Made by splitting the proximal end and shaft of a bison metapodial down the long axis and sharpening the middle of the shaft to a chisel end.

Length: Minimum 144 mm.; maximum 193+mm.

HIDE GRAINERS

(*5 specimens*)

Heads of bison humeri cut from the bone so that a large area of cancellous tissue is exposed.

SCAPULA KNIVES

(Fig. 26)

(*10 specimens*)

Flat sections from the blade of a bison scapula with a long handle and a hooked end which tapers to a sharp point. All of the edges vary from blunt and rounded to fairly sharp.

Length: Mean 124 mm., range 59 to 171 mm.
Handle width: Mean 25 mm., range 13 to 35 mm.
Maximum width: Mean 49 mm., range 23 to 73 mm.

SCAPULA SCRAPERS

(Fig. 33)

(*20 specimens*)

Long, straight-sided fragments of the blade of a bison scapula which were worked into scrapers with one sharp and one blunt edge. In some cases the piece was cut from the posterior border with the ridge either left intact or partly cut away. In others it was cut so that the scapular spine formed one edge, and the spine was partly cut away. A third variant was cut from the central part of the blade.

Length: Mean 169 mm., range 120 to 210 mm.
Width: Mean 64 mm., range 46 to 76 mm.

SCRAPER HAFTS

(Fig. 27)

(*19 specimens*)

The dorsal ends of bison ribs with the cancellous tissue hollowed out and the edges of the cut end ground smooth. The socket in the end of the rib would have made an ideal seat for the narrow part of the small end scrapers found at the site. This supposition is borne out by the fact that a number of the sockets are broken away by some sort of leverage applied from the inside. All the ends opposite the sockets were broken, so it was impossible to determine the original lengths of these tools. Several of them were well over 200 mm. long.

KNIFE HANDLES

(Fig. 26)

(*7 specimens*)

Segments cut from the ventral ends of bison ribs and grooved along one edge to allow for the insertion of a stone or metal knife blade. Two of these pieces were found with metal blades in place.

Length: Mean 171 mm., range 122 to 239 mm.

ARROW-SHAFT WRENCHES

(Fig. 28)

(*6 specimens*)

Made by drilling a series of more or less circular holes of different diameters through a section cut from the ventral end of a bison rib.

Length: All specimens broken, all apparently over 200 mm. long.
Hole diameters: Mean 13 mm., range 9 to 14 mm.

BONE TUBES

(Fig. 34)

(*14 specimens*)

Segments cut from long bones of birds and small mammals. None of these pieces was decorated in any way. One of the longest pieces had a smaller tube of

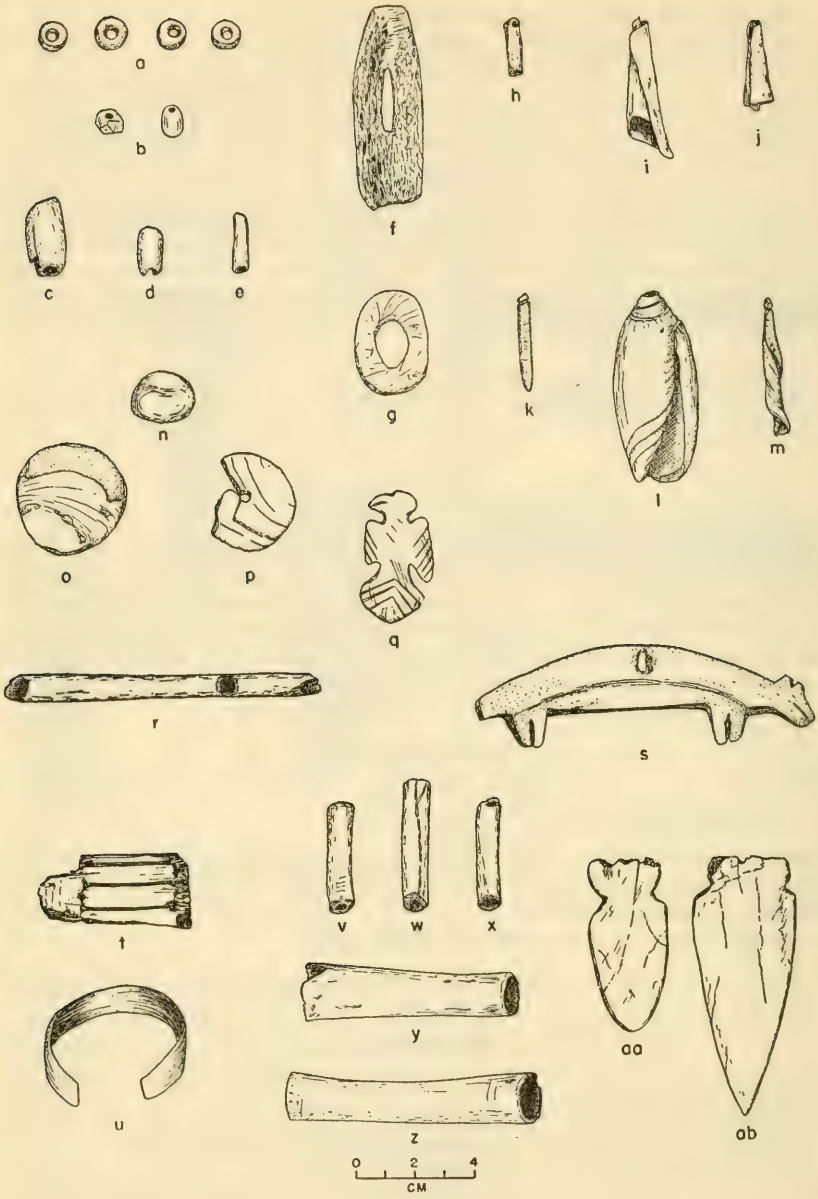

FIGURE 34.—Ornaments, Dodd site. *a*, *d*, and *e*, Shell beads; *b*, glass beads; *c*, clay bead; *f*, *g*, open-center bone pendants; *n*, *o*, shell disks; *h–j*, brass tinklers; *k–m*, *p*, and *s*, shell pendants; *q*, bird silhouette; *r*, whistle; *t*, bow guard fragment; *u*, brass bracelet; *v–z*, bone tubes; *aa*, *ab*, spear-shaped bone pendants.

the same length inserted in it. There are three groups of tubes on the basis of the length:

Group 1; 6 specimens.

Length: Mean 40 mm., range 37 to 45 mm.

Group 2; 4 specimens.

Length: Mean 80 mm., range 73 to 88 mm.

Group 3; 4 specimens.

Length: Mean 118 mm., range 113 to 122 mm.

WHISTLE

(Fig. 34)

(*1 specimen*)

A section of bird long bone with a small notch cut through one side.

Length: Over 110 mm.

SNOW SNAKE

(Fig. 32)

(*1 specimen*)

Deer antler tine with a deep tapered socket in the cut end; tip polished. This piece is similar to those figured by Culin (1907, figs. 536–539 and 542), which were used as javelin heads or which had feathers attached to the socketed end. Both the javelins and the feathered pieces were used in various forms of the "snow-snake" game.

Length: 45 mm.

Hole diameter: 8 mm.

ORNAMENTS

(Fig. 34)

BONE

Spear-shaped bone pendants; 3 specimens.

Pendants (?) cut from the thin area of the blade of a bison scapula in the form of a spear point.

Lengths: 60 and 88 mm.

Widths: 26 and 35 mm.

Open-center bone pendants; 4 specimens.

Oval to rectangular pendants (?) with the centers removed; cut from the thin area of the blade of a bison scapula.

Lengths: 35 and 71 mm.

Widths: 22 and 65 mm.

Note: These pieces are similar to objects which have previously been classed as "fishhook blanks." The occurrence of four such blanks but no fishhooks at the Dodd site raises some question regarding this interpretation.

Antler bracelet or bow guard; 1 specimen.

A fragment from a piece of elk antler which had apparently been steamed and bent into some sort of wristlet. Ornamented with incised decoration.

Effigy bone pendant; 1 specimen.

A piece of buffalo (?) bone carved into a conventionalized bird silhouette and decorated with incising at the beak, wings, and tail.

SHELL

Shell pendants; 4 specimens.

Conventionalized silhouette of a bear (?) cut from a large marine bivalve and drilled for suspension.

Shell disk 32 mm. in diameter drilled for suspension.

An *Oliva sayana* Ravenel shell with the spire removed.

A long, tapered sliver of shell encircled by a groove at the large end.

Discoidal shell beads; 5 specimens.

Perforated shell disks.

Diameters: Mean 10 mm., range 5 to 12 mm.

Thickness: Mean 4 mm., range 4 to 5 mm.

Tubular shell bead; 1 specimen.

Length: 15 mm.

Diameter: 8 mm.

Dentalium shell bead; 1 specimen.

A very highly polished bead made from a dentalium shell.

Length: 19 mm.

Maximum diameter: 16 mm.

Shell disks; 2 specimens.

Undrilled disks cut from the shell of some large bivalve.

Diameters: 21 and 37 mm.

GLASS

Blue glass beads; 2 specimens.

One whole and one fragmentary bead made from translucent blue glass. The beads are decahedral rather than spherical.

Diameter: Ca. 5 mm.

White glass beads; 4 specimens.

More or less ovoid beads made of opaque milky glass.

Length: Mean 11 mm., range 10 to 12 mm.

Diameter: Mean 7 mm., range 7 to 8 mm.

CLAY BEAD

(*1 specimen*)

A tubular clay bead.

Length: 27 mm.

Diameter: 13 mm.

Metal Ornaments and Other Objects

Three metals were found at the Dodd site—brass, iron, and copper. Most of the pieces were unrecognizable fragments, but a few were definite artifacts. It is particularly interesting that no metal artifact in the collection is of European manufacture, the pieces representing native utilizations of White materials.

BRASS

Knife blade; 1 specimen.

A flat rectangular sheet of brass 29 by 135 mm. hafted in the edge of the ventral end of a bison rib.

Bracelet (fig. 34); 1 specimen.

A thin semicircular bracelet with tapered and rounded ends.

Width: 13 mm.

Maximum diameter: 46 mm.

Tinklers; 4 specimens.

Small conical or cylindrical objects rolled of thin sheet brass. One was drilled at the small end. These were probably used as "tinklers" on a garter or on the fringe of some other garment.

Length: Mean 29 mm., range 18 to 47 mm.

Maximum diameter: Mean 10 mm., range 6 to 15 mm.

Unidentifiable fragments; 10 specimens.

IRON

Knife blades (fig. 26); 3 specimens.

Two asymmetrical leaf-shaped pieces of thin iron, one hafted in the edge of the ventral end of a bison rib.

Lengths: 38 and 53 mm.

Widths: 17 and 23 mm.

One triangular piece of thin iron 20 by 50 mm.

Chisel (fig. 29); 1 specimen.

A long, concave-sided piece of thin iron with one flared end that was apparently sharpened to a cutting edge.

Length: 61 mm.

Width: 18 mm.

Spike or awl; 1 specimen.

Length: 105 mm.

Arrow point; 1 specimen.

Long, triangular.

Length: 31 mm.

Width: 10 mm.

Unidentifiable fragments; 6 specimens.

COPPER

Copper tubes; 4 specimens.

Small fragments of sheet copper rolled into tubes. Two were rolled around twigs which had been preserved by the action of the copper salts.

Length: Fragmentary, up to 60 mm.

Diameter: Crushed, up to 5 mm.

THE ASSOCIATIONS

Even during the early stages of the work at the Dodd site, it was apparent that the archeological situation there was a fairly complicated one. The presence of three styles of houses, and the repeated instances of the superposition of one house upon another indicated more than one occupation of the village. It seemed likely that different types of artifacts and pottery would prove to be associated with the different types of houses, but there were a number of difficulties in establishing these associations.

There is an inevitable mixing of the cultural debris in any village which is occupied for a long period of time, and this is particularly true of the earth lodge sites of the Plains. Older materials were repeatedly brought up to the occupation surface when house and cache pits were dug. The collapse of house superstructures probably carried older

materials into the house pits, materials which had been included in the earth used to blanket the superstructure. On the other hand, younger materials must have been intruded into older levels when trash was thrown into cache pits and the pits of ruined houses. In such a situation it is obvious that there may be considerable difficulty in establishing clear-cut differences between the trait complexes which were characteristic of the different occupations.

The following statistical treatment was used during the analysis of the Dodd site material in order to permit the recognition and elimination of these accidental associations and to verify other phases of the analysis. It is presented here with the full realization that many archeologists will feel that it is adding unnecessary complications to an already overburdened ritual. However, it would seem that some such objective treatment of archeological data is necessary if the analysis of such a body of data is to be anything more than a subjective expression of the analyst's preconceptions.

The first stage in the study of the Dodd site material consisted of making a strictly typological classification of the houses excavated and of the pottery and other artifacts found. It should be emphasized that the individual artifacts were classified entirely on the basis of their physical characteristics, with no reference to provenience within the site.

Once the various house and artifact types had been established, and the individual items had been classified, it was possible to begin to define the cultural complexes represented at the site. This was done by means of a statistical treatment of the data which was carried out in three successive steps.

The first step was designed to indicate the number of components which were present at the site. Three types of houses were distinguished by structural differences and by different relative positions in the stratigraphic column. Therefore, each house type was tentatively assigned to a separate component. A statistical comparison was then made between the total sherd sample from the floors of each group of houses and the entire sherd sample from the site. It was found that the proportions of the various pottery types in each of the three groups of sherds differed significantly from the proportions of these same types in the total sample from the site. This showed that the architectural differences between the three house types were reflected by statistically significant differences between the sherd samples associated with each type.

The second step in the statistical treatment consisted of determining which of the individual findspots within the site could be assigned to one of the three components. This was done by comparing the proportions of the different classes of pottery from each findspot with the

proportions established for the total sherd sample from each of the house groups. When a findspot showed a close similarity to a single house group, it was assigned to the component represented by that group of houses. When it differed significantly from all three components it was presumed to contain a mixture of materials, and was disregarded during the rest of the analysis.

The final step in this treatment consisted of demonstrating the presence or absence of a statistically positive association between each of the classes of pottery and other artifacts and one or more of the components. When a positive association was established, it was considered to be a demonstration that that class of artifact was characteristic of the component with which it showed a positive association.

The initial phase of the statistical treatment was based on the fact that the houses excavated at the Dodd site demonstrated the presence of three different architectural traditions. One was represented by the round houses, Features 1, 7, 8, 11, 15, 25, 35, 73, 106, and 107. A second was represented by the long-rectangular houses in which most of the post holes which had contained the wall members were located along the long sides of the house pit. This group included Features 17, 29, 34, 61–62, 76, 88, and 100. The third tradition was represented by the long-rectangular houses in which the wall members had been more or less evenly distributed around all four sides of the pit, Features 5, 41, 42, and 95.

There were numerous instances in which a house of one style was superimposed over a house of another style (fig. 35). This demonstrated that the different architectural traditions dated from different periods during the occupation of the site. In each of the five instances of superposition involving circular houses, the circular house overlay a rectangular structure. The fact that the circular houses were invariably superimposed rather than superimposed upon demonstrates that they represent the final occupation of the village. Features 29, 76, and 88 were long-rectangular houses with the majority of the wall posts set along the long sides of the pit. Each of these structures was overlain by a circular house. Features 29 and 88 also cut through the pits of rectangular houses in which the wall posts were evenly distributed around all four sides of the pit. The occurrence of Features 29, 76, and 88 below circular structures and cut through older rectangular structures demonstrates that the houses with the majority of the wall posts set along the long sides of the pit represent the middle occupation of the village. Features 5, 41, 42, and 95 were long-rectangular structures with the wall posts evenly distributed around all four sides of the pit. Each one of these houses was overlain by a circular structure, and Features 5 and 42 were also cut by

	House Type	Feature Number				
Stanley		1	7	8	15	25
Anderson		29	88		76	
Monroe		5	42	41		95

FIGURE 35.—House superposition at the Dodd site.

the pits of later rectangular structures, a series of superpositions which demonstrated that these houses represented the earliest occupation of the village.

It seemed reasonable to assume that the three architectural traditions represented three components at the site, and that the three components would prove to be assignable to three different foci. As a working hypothesis, the earliest occupation, represented by the houses Features 5, 41, 42, and 95, was assigned to a Monroe Focus. The middle occupation, represented by the houses Features 17, 29, 34, 61–62, 76, 88, and 100, was assigned to an Anderson Focus. The final occupation of the site, represented by the round houses Features 1, 7, 8, 11, 15, 25, 35, 73, 106, and 107, was assigned to a Stanley Focus. The sequence from Monroe through Anderson to Stanley was demonstrated by the various instances of the superposition of the characteristic houses.

In order to test the validity of these three foci, the associated pottery was checked against houses to determine the extent to which the differences in the architectural patterns were reflected in the

ceramic complex. This check was made by treating all the sherds from the floors of each group of houses as a unit. This gave three lots of sherd material, one representing the Monroe Focus, a second representing the Anderson Focus, and a third representing the Stanley Focus. The proportion of each class of sherds in each of the three lots was contrasted with the proportion of that same class of sherds in the total sample from the Dodd site. The differences in the proportions of the individual classes were computed in terms of standard errors.[3] These individual differences were then added, and the sum divided by the number of classes in order to obtain the mean standard error of the difference between the individual group and the total sample from the site.

In this sort of statistical treatment, the difference in mean standard errors indicates whether or not two samples come from the same or different universes. If two samples differ from each other by less than five mean standard errors, they are similar enough that they may represent the same complex. If the two samples differ from each other by more than five mean standard errors,[4] they are so unlike that the differences could hardly have occurred because of sampling variations, and they presumably represent two different complexes.

The difference in mean standard errors between the primary sherd counts for the individual foci and the total sherd sample from the Dodd site is as follows:

	M. s. e.
Stanley Focus	22.0
Anderson Focus	17.3
Monroe Focus	10.2

It will be seen that in every case the proportions in the sherd samples from the floors of the groups of houses assigned to the various foci differed from the total sample from the site by much more than five mean standard errors. This provides a statistical demonstration of the fact that the sherd samples representing the individual foci are significantly different from the total sample from the site, and hence presumably represent three different cultural complexes. Since the differences in the associated pottery complement the architectural and temporal separation of the three groups of houses, the differences

[3] The formulae used for determining the standard errors were:

For a subsample against the total sample s. e. $= (po \times qo)^{\frac{1}{2}} \left(\frac{N-n}{N \times n}\right)^{\frac{1}{2}}$

For two separate samples s. e. $= (po \times qo)^{\frac{1}{2}} \left(\frac{N}{n_1 \times n_2}\right)^{\frac{1}{2}}$

po = Percentage of the class under consideration in the total sample.
qo = Percentage of all other classes in the total sample.
N = Total sample.
n = Number of sherds in the subsample.
n_1 = Number of sherds in one sample.
n_2 = Number of sherds in the other sample.

[4] Cf. footnote 5, p. 78.

in the pottery provide additional support for the postulation that the three groups of houses represent three different foci.

The next step in isolating and defining the foci was to assign the individual findspots within the site to one or another of them. This was done by comparing the sherd sample from the individual loci (the house floors, the house fills, and the cache pits) with the sherd counts from all of the floors in each of the three house groups. Since most of the individual loci contained relatively few rim sherds, these comparisons were made in terms of the surface treatment of the body and neck sherds. In order to have adequate samples with which to work, no feature which yielded less than 50 body sherds was considered.

The comparison was again made in terms of mean standard errors. When a particular locus fell within five mean standard errors of one focus, it was accepted as belonging to and representing that focus. When a locus differed by more than five mean standard errors from each of the three foci, it was presumed to contain a mixture of materials from more than one component, and thus to have no value as a representative findspot.[5]

This phase of the analysis also provided a check on the preceding one through the comparison of the sherd samples from the individual house floors with the combined samples from all of the house floors assigned to that particular focus. The fact that each of the floor samples showed a close agreement with the total sample from the group to which it had been assigned provides a convincing argument for the validity of the original grouping of the houses on the basis of architectural similarities and stratigraphic position.

The results of this second step in the statistical analysis is presented graphically in figure 36. On the basis of these results, the individual findspots were assigned to foci as follows:

Stanley:

Floor and fill of circular houses, Features 1, 7, 8, 11, 15, 35, 73, 106, and 107.

Cache pits, Features 3, 4, 4–A, 44, 69, 72, and 102.

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[5] In most statistical treatments making use of the standard error, the "level of significance" is set at three rather than five standard errors. It has been raised to five in both instances in which the technique has been applied here. In the first case, in comparing the sherd samples from the three house groups with the total sample from the site, this imposed a more rigorous control since this step consisted of establishing *differences*. In the second step, in assigning the individual findspots to foci, it imposed a somewhat less rigorous control since this step consisted of establishing *similarities*. However, raising the level of significance appears to be fully justified because of the nature of the samples treated. The use of three standard errors is based on the premise that the samples considered are products of *simple sampling* in the statistician's sense. The individual loci at the Dodd site appear to represent three different cultural complexes. Because of this, samples drawn from them must be considered to be products of *purposive* rather than *simple* sampling. Such a breakdown in the sampling conditions tends to increase the standard error. (Cf. Yule and Kendall, 1937, pp. 362-363.) Because of this, the level of significance has been raised here. The level was set at five mean standard errors on the basis of the results presented in figure 36. If the individual differences shown there are plotted in order of magnitude, they produce a smooth curve between the values 0.5 and 4.9. Above the 4.9 level there is a sharp break in the curve, a break which seems to justify the use of 5.0 mean standard errors as the significant level in this particular study.

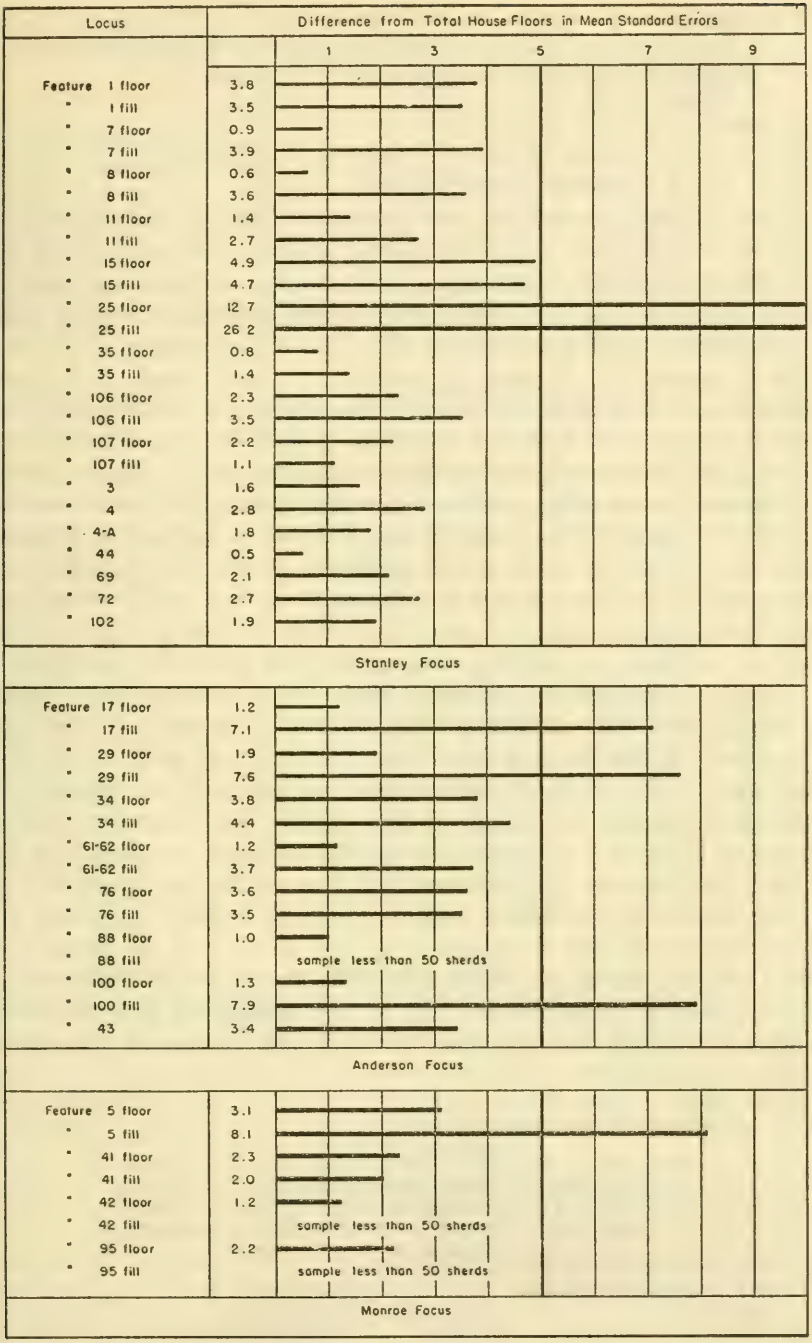

FIGURE 36.—Differences in mean standard errors between the pottery percentages of the individual findspots and the focal means at the Dodd site. (The focal means are the proportions of the various body treatments in the total sherd sample from the floors of all of the houses assigned to the focus.)

Anderson:
Floor of rectangular houses, Features 17, 29, 34, 61–62, 76, 88, and 100.
Fill of rectangular houses, Features 34, 61–62, and 76.
Cache pit, Feature 43.
Monroe:
Floor of rectangular houses, Features 5, 41, 42, and 95.
Fill of rectangular house, Feature 41.

Having demonstrated the probability that there were three components at the Dodd site, and having assigned the majority of the individual loci within the site to one or another of these components, it was possible to test the association of the individual pottery types and artifact groups with each of these three components. This was done by computing the *index of association* between each of the components and the individual traits.[6] This index is a numerical expression of the premise that two traits are positively associated if they occur together more often than they occur separately. In computing the indices, it was only possible to use the items which were found in loci which had previously been assigned to one or another of the components. Those artifacts which occurred in the test trenches and other places which could not be pinned down to a single component were used in preparing the description of the artifact group, but they were of no value in assigning that group to a particular component.

Because of the general similarity of the houses and pottery assigned to the Monroe and Anderson Foci, indices of association were also computed for the various traits and the Anderson and Monroe loci combined. This made it possible to assign some artifact types to the early occupation of the village, despite the fact that it was not possible to assign them to a particular focus. These traits are shown on the border line between the Anderson and Monroe Foci in figure 53.

The indices of association of the individual artifact types and the three foci are shown in tables 1, 2, and 3. It will be noted that some artifact classes are not included in the table. Unfortunately, these classes were represented by so few specimens and so widely scattered through the site, that they showed a negative association with all three foci.[7]

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[6] The index of association was computed by the formula:

$$\text{I. A.} = \frac{(a \times b) - (c \times d)}{(a \times b) + (c \times d)}$$

a = Number of findspots assigned to the focus being tested in which the trait occurred.
b = Number of times the trait occurred in findspots assigned to the focus being tested.
c = Number of findspots assigned to the focus tested in which the trait did not occur.
d = Number of times the trait occurred in findspots assigned to other foci.

[7] Unassigned artifact groups from the Dodd site include:

Arrow-shaft smoothers, Group 2
Bone tubes
Drills
Full-grooved mauls
Hammerstones
Hide grainers
Horn scoops
Rubbing stones
Scoria sharpening stones
Stemmed knives
Whetstones.

TABLE 1.—*Indices of association between pottery classes and foci at the Dodd site*

Pottery class	Stanley Focus		Anderson Focus		Monroe Focus	
	Number	*I. A.*	*Number*	*I. A.*	*Number*	*I. A.*
Stanley Wavy Rim	188	*+1.00*	7	−0.97	0	−1.00
Stanley Cord Impressed	80	*+.99*	1	−.99	1	−.99
Stanley Tool Impressed	98	*+.99*	1	−.99	0	−1.00
Stanley Plain	29	*+.97*	1	−.99	0	−1.00
Foreman Cord Impressed	28	−.70	116	*+1.00*	19	−.43
Foreman Incised	7	−.87	6	−.47	8	*+.43*
Anderson High Rim	29	−.57	76	*+1.00*	51	*+1.00*
Anderson Low Rim	7	−.87	29	*+.59*	13	*+1.00*
Monroe Collared Rim	0	−1.00	2	−.86	6	*+.71*
Brushed	399	*+1.00*	3	−.99	2	−.99
Simple Stamped	3,799	*+1.00*	102	−.58	8	−.98
Plain	852	*+1.00*	685	*+1.00*	171	*+1.00*
Cord Roughened	351	−.88	1,802	*+1.00*	934	*+1.00*

TABLE 2.—*Indices of association between stone artifact groups and foci at the Dodd site*

Artifact category	Stanley Focus		Anderson Focus		Monroe Focus		Anderson and Monroe Foci	
Arrow points:	*Number*	*I. A.*	*Number*	*I. A.*	*Number*	*I. A.*	*Number*	*I. A.*
Group 1	17	*+1.00*	0	−1.00	0	−1.00	0	−1.00
Group 2	16	*+1.00*	0	−1.00	0	−1.00	0	−1.00
Group 3	4	−.90	7	−.16	4	−.61	11	*+.56*
Group 4	5	−.82	4	−.90	9	*+.60*	13	*+.54*
Group 5	5	−.85	7	−.16	5	−.57	12	*+.42*
Knives:								
Group 1	5	−.81	8	−.15	4	−.66	12	*+.30*
Group 4	14	*+.84*	0	−1.00	1	−.96	1	−.99
Group 5	5	*+.14*	1	−.96	0	−1.00	1	−.97
End scrapers:								
Group 1	5	−.96	27	*+.47*	21	*+1.00*	48	*+.95*
Group 2	4	−.97	19	*+.48*	14	*+.42*	33	*+.92*
Group 3	45	*+.54*	10	−.81	9	−.61	19	−.51
Group 4	3	−.97	25	*+.37*	17	*+1.00*	42	*+.95*
Group 5	36	*+.96*	2	−.98	0	−1.00	2	−.98
Large blanks	1	−.99	9	*+.43*	3	−.67	12	*+.81*
Shaft smoothers:								
Group 1	3	*+1.00*	0	−1.00	0	−1.00	0	−1.00
Group 3	0	−1.00	1	−.82	1	−.60	2	*+1.00*
Celts	1	−.98	5	*+.30*	0	−1.00	5	.00
Drills: Group 3	0	−1.00	3	*+1.00*	0	−1.00	3	*+1.00*
Glass beads	6	*+1.00*	0	−1.00	0	−1.00	0	−1.00
Metal	19	*+1.00*	0	−1.00	0	−1.00	0	−1.00

The three phases of the statistical treatment of the data from the Dodd site may be summarized as follows: First, a comparison of the proportions of the different classes of sherds in the combined samples from each of the three house groups with the proportions of those same classes in the total sample from the site showed a significant difference between the individual samples and the total sample. These differences complemented the differences between the three groups of houses, and thus supported the postulation that there were three components at the Dodd site. The second step in the statistical treatment demonstrated which of the individual findspots might be assigned to a single component and which ones contained a mixture of materials from more than one component. The third step demonstrated the presence or absence of a positive association between the individual artifact categories and one or more components.

TABLE 3.—*Indices of association between bone artifact groups and foci at the Dodd site*

Artifact category	Stanley Focus		Anderson Focus		Monroe Focus		Anderson and Monroe Foci	
	Number	*I. A.*	*Number*	*I. A.*	*Number*	*I. A.*	*Number*	*I. A.*
Bone hoes:								
Group 1	4	−0.88	8	*+0.03*	5	−0.19	13	*+0.61*
Group 2	15	*+.35*	0	−1.00	3	−.90	3	−.97
Group 4	1	*+1.00*	0	−1.00	0	−1.00	0	−1.00
Picks	0	−1.00	3	*+1.00*	0	−1.00	3	*+1.00*
Quill flatteners	10	−.89	24	*+.83*	12	*+.17*	36	*+.92*
Awls:								
Group 1	11	−.78	19	*+.29*	17	*+.39*	36	*+.82*
Group 2	2	−.83	0	−1.00	2	−.20	2	−.75
Group 3	1	−.99	10	−.18	11	*+.20*	21	*+.91*
Group 4	0	−1.00	3	*+1.00*	0	−1.00	3	*+1.00*
Group 5	0	−1.00	1	−.82	1	−.60	2	*+1.00*
Group 6	0	−1.00	1	−.82	1	−.60	2	*+1.00*
Punches:								
Group 1	1	−.99	16	*+.60*	6	−.61	22	*+.93*
Group 2	0	−1.00	6	−.07	4	*+.45*	10	*+.93*
Group 3	6	*+1.00*	0	−1.00	0	−1.00	0	−1.00
Group 4	2	*+1.00*	0	−1.00	0	−1.00	0	−1.00
Fleshers:								
Group 1	3	*+1.00*	0	−1.00	0	−1.00	0	−1.00
Group 2	0	−1.00	3	*+1.00*	0	−1.00	3	*+1.00*
Scapula knives	0	−1.00	2	−.74	3	*+.38*	5	*+.39*
Scapula scrapers	6	−.73	7	−.21	3	*+.06*	10	*+.25*
Scraper hafts	1	−.99	5	−.36	3	−.78	8	*+.45*
Knife handles	6	*+1.00*	0	−1.00	0	−1.00	0	−1.00
Arrow-shaft wrenches	4	*+1.00*	0	−1.00	0	−1.00	0	−1.00
Bone tubes	5	−.55	4	−.49	0	−1.00	4	−.69

The final step in the statistical treatment also served another purpose. In addition to demonstrating positive associations between individual traits and the different components, it provided a basis for isolating items which appeared to be alien to the particular context in which they were found. For example, certain pottery treatments which were positively associated with the Monroe and Anderson Foci appeared as minority groups in some Stanley Focus contexts. These appearances might be explained as survivals into the later horizon. However, there is a strong possibility that these early pieces were intruded into the later contexts by some process of mechanical mixture. This premise is borne out by two pieces of supporting evidence. The south section of the village showed no trace of occupation prior to Stanley Focus times, and the material from the two houses excavated there included none of the pottery which showed a positive association with the earlier foci. The second point which argues against an explanation in terms of survivals is the fact that there is a fairly large body of evidence, discussed later, which points to a considerable time interval between the Anderson and Stanley occupations of the Dodd site.

Because of the strong possibility that mechanical mixture had put some individual artifacts out of context, the complexes set up for the individual foci in a later section have been restricted to those traits which show a positive association with that focus. Traits which did not occur frequently enough to show a positive association have not been included, even though they were occasionally repre-

sented in loci assigned to the focus under consideration. Similarly, the totals used in computing the pottery percentages for the individual foci include only sherds of types which are positively associated with the focus together with such miscellaneous pieces as fall outside any of the types recognized at the Dodd site. While work in single-component sites representing the Monroe, Anderson, and Stanley foci may well expand the trait lists established on this basis at the Dodd site, those lists which are presented in later pages appear to be the best ones which can be set up at this time.

THE PHILLIPS RANCH SITE

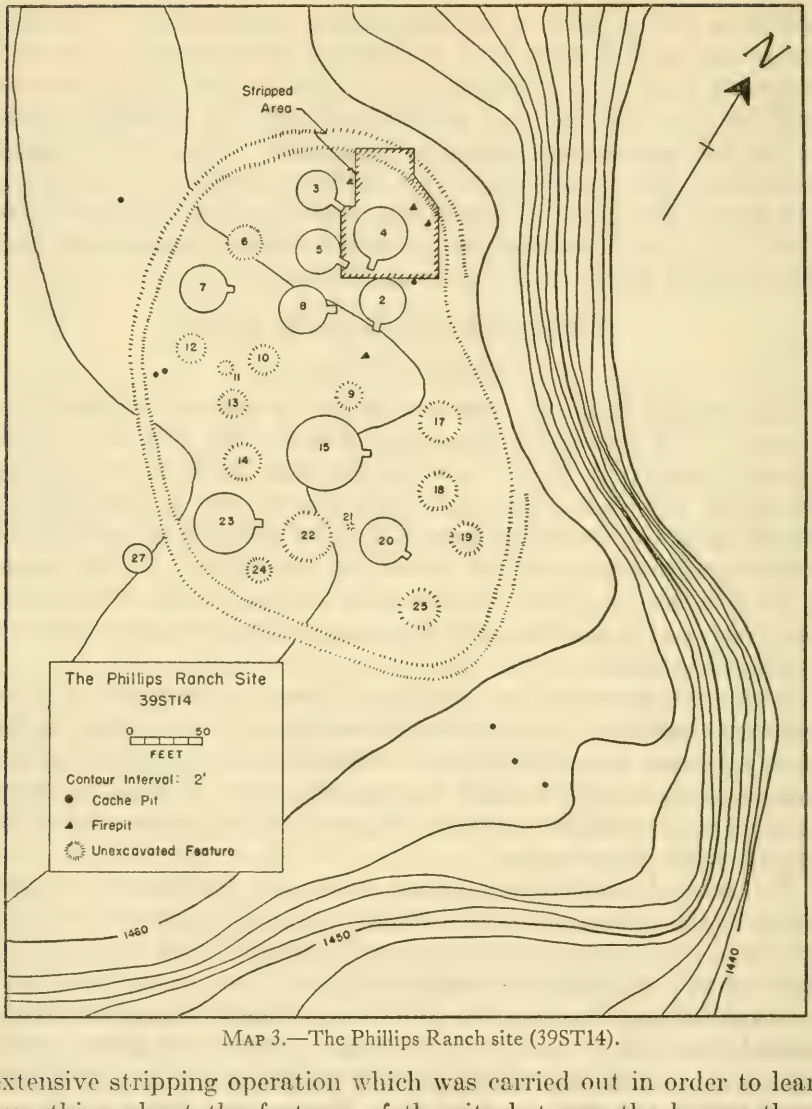
INTRODUCTION

The Phillips Ranch site was named for the property on which it is located. It is a fortified village located in sec. 32, T. 6 N., R. 31 E., Stanley County, S. Dak. It is on the west bank of the Missouri River 5.2 river miles upstream from Pierre, and 1.1 miles downstream from the Dodd site (map 1). The village is situated on the very edge of the terrace which bounds the flood plain. An old channel of the river lies just below the site, some 700 yards west of the present river bed, and there is a fairly deep, sod-covered tributary draw just south of the village.

Prior to excavation, the site (map 3) was covered with a heavy sod which sealed in most of the cultural debris. The surface indications consisted of a shallow linear depression marking the fortification ditch, 23 roughly circular depressions, from 8 to 45 feet in diameter, which presumably marked the locations of houses, and a few other surface irregularities

The normal stratigraphic section within the occupation area consisted of the sod and root zone which extended to a depth of about 0.5 feet. This zone was almost sterile. Below it was a layer of silt, dark-colored and heavily charged with the debris which had accumulated during the occupation of the site. The refuse-bearing stratum ranged from 0.5 to 2.5 feet in thickness. Below the refuse mantle there was a sterile native soil—a tan wind-laid silt with a fairly well-developed humus zone near the top. There was a second dark zone 7 to 8 feet below the top of the native soil. It was from 1.5 to 2 feet thick, and contained occasional small flecks of charcoal. No cultural debris of any kind was noted, and it seems possible that the charcoal was the result of a grass fire.

With two exceptions, the excavation techniques used at the Phillips Ranch site were identical with those employed at the Dodd site. One change was the abandonment of the practice of cutting a short trench across the cache pits. At the Phillips Ranch site we simply removed the refuse-bearing fill. A second innovation consisted of a fairly



Map 3.—The Phillips Ranch site (39ST14).

extensive stripping operation which was carried out in order to learn something about the features of the site between the houses themselves. An area of roughly 175 square yards was completely cleared of the refuse overburden which was removed with shovels and wheelbarrows. The exposed surface of the native soil was then troweled off, and the post holes, cache pits, etc., located by troweling were cleared out. Horizontal control in the stripped area was in terms of grid of 10-foot squares. Simply moving such a large amount of dirt involved considerable work. However, the information which was obtained on the character of the village as a whole seems to be an adequate justification of the effort.

There was evidence of only a single component at the Phillips Ranch site, and it has been assigned to the Snake Butte Focus. The internal evidence which is discussed in detail in a later section indicates that the Snake Butte Focus follows immediately after the Stanley Focus in time.

THE FEATURES

THE FORTIFICATION DITCH

The Phillips Ranch site was surrounded by a fortification ditch some 1,000 feet long. The ditch formed a rough ellipse with major axes approximately 230 by 330 feet. The depression which marked the location of the ditch at the time of excavation was from 5 to 18 feet wide and from 1 to 2 feet deep. There were no visible breaks in the ditch line, although the outer edge of the depression disappeared where it coincided with the terrace edge on the east side of the village. The ditch was cross-sectioned with two test trenches, and fairly extensive excavations were made at a point near the north end of the ellipse. This was done to investigate a cutback in the inner wall of the surface depression which might have indicated an entrance to the village. It proved to be a slight offset in the line of the ditch proper.

In cross section, the ditch appeared as an irregular U-shaped intrusion of the refuse overburden into the native soil (fig. 37). The sides

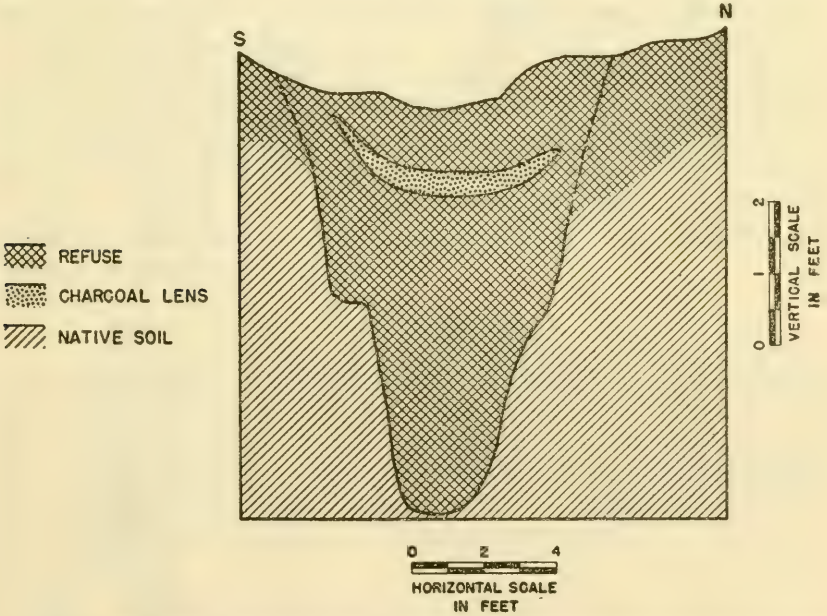


FIGURE 37.—Cross section of the fortification ditch at the Phillips Ranch site.

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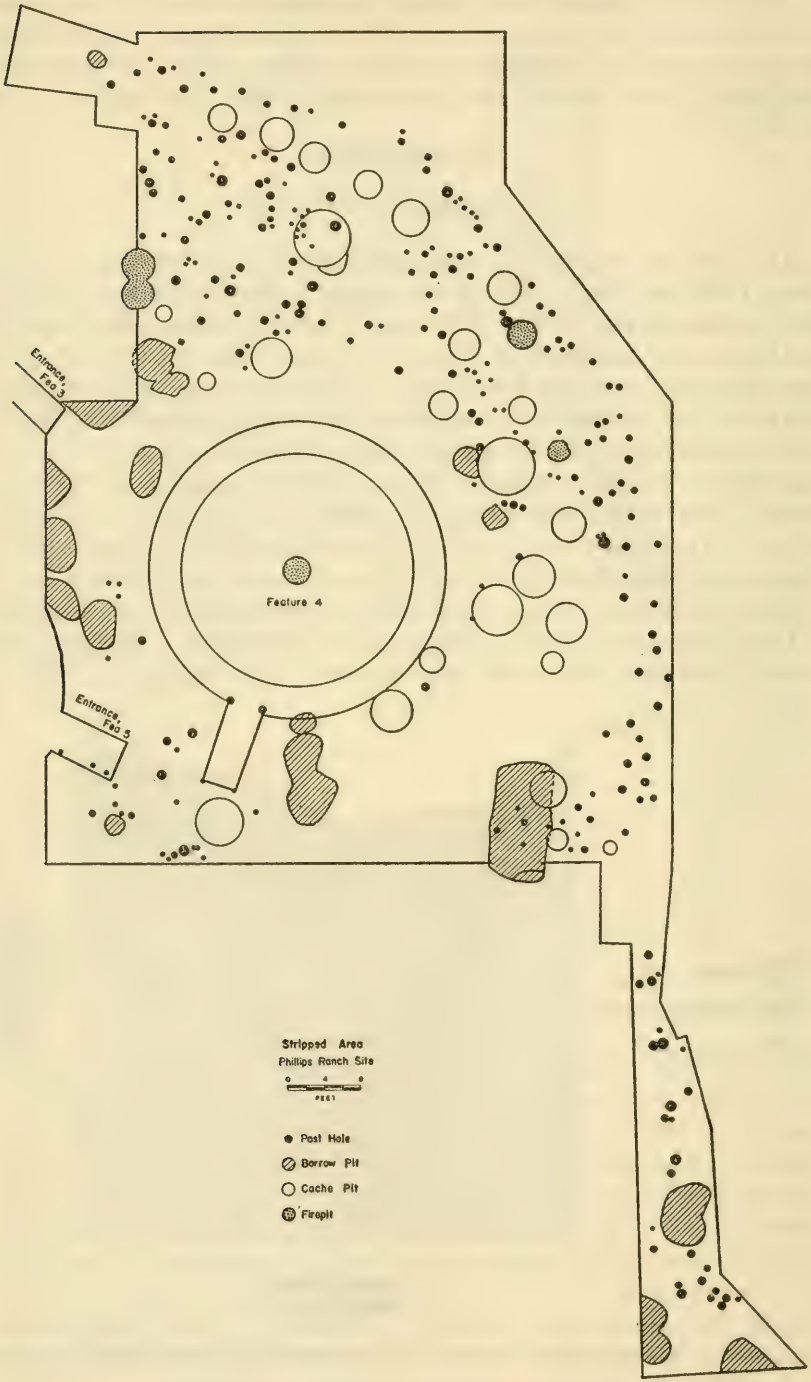

MAP 4.—The stripped area at the Phillips Ranch site.

of the ditch itself sloped inward toward the rather flat bottom. There was a more or less well-defined "step" near the top of the inner wall of the ditch. The ditch had a mean width of 3 to 6 feet below the "step," and from 6 to 8 feet above the "step." The bottom of the ditch was 5.9 to 6.8 feet below the ground surface at the time of excavation, and 4.5 to 5.7 feet below the top of the native soil. It was thus somewhat larger in both dimensions than the ditch at the Dodd site.

THE PALISADE

When the refuse overburden had been stripped off a considerable part of the northeast section of the site, a great many post holes were exposed in the underlying native soil (map 4). One series of these holes, spaced from 0.5 to 5.9 feet apart, formed an irregular row which followed the curve of the inner wall of the fortification ditch. It was assumed, during the early stages of the excavation, that these post holes represented the remains of a palisade similar to those reported from other sites in the area. Later, excavation in another part of the site showed no trace of this feature, and we returned to the stripped area and extended a trench in both directions along the line of the fortification ditch. The row of post holes which was thought to have been a palisade ended abruptly in both trenches, leaving an irregular line of post holes approximately 160 feet long. The line of holes followed the curve of the inner edge of the fortification ditch, and extended around the northeast section of the village.

A palisade which does not form a complete enclosure, and one which is located on the most easily defendable side of the village, seems to be something of an anomaly. The most likely explanation would seem to be that the fortification ditch had been dug early in the occupation of the site, that later it had been found inadequate, and that a palisade had been designed to supplement it. The palisade presumably had never been completed.

THE HOUSES

Ten houses were completely excavated at the Phillips Ranch site. All of them conformed to the same general pattern. There were no instances of one house being superimposed upon another one, and there were no instances in which the edge of a house pit was definitely intersected by a cache pit. Thus, there is no stratigraphic evidence that the village had more than a single component.

Feature 2 (fig. 38).

Shape: Circular.
Dimensions: Diameter, 30.8 feet; depth, 2.2 feet.
Pit walls: Unfaced refuse and native soil.

Floor: Tramped bottom of the pit.

Roof supports: Four single and multiple primary supports set in a rough square around the firepit. Wall posts consist of light members with occasional heavier ones interspersed at irregular intervals. Wall posts were set against or partly in the pit wall. There was also an irregular circle of posts set about 4 feet in from the pit wall.

Entrance: Opening to the southeast.

Firepit: Centrally located basin filled with whitish ash.

Floor pits: Seven undercut and four straight-sided cache pits. One of the undercut pits had been dug partly in the floor and partly into the wall of the house pit. It opened into the house itself rather than at ground surface.

Comments: This house had been burned.

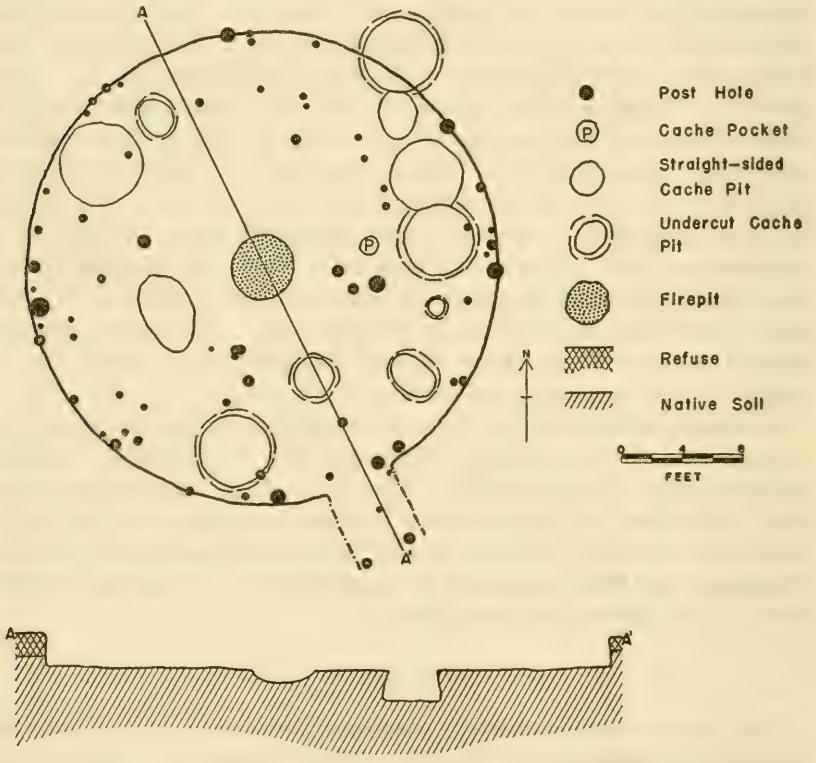

FIGURE 38.—Feature 2, Phillips Ranch site.

Feature 3 (fig. 39).

Shape: Circular.

Dimensions: Diameter, 25.8 feet; depth, 2.3 feet.

Pit walls: Unfaced refuse and native soil.

Floor: Tramped bottom of the pit.

Roof supports: Four single and multiple primary supports set in a parallelogram around the firepit. Most of the wall posts were small and set at the base of the pit wall. Eight heavy posts were evenly interspersed.

There was also a semicircle of posts set in about 3 feet from the wall opposite the entrance.

Entrance: Opening to the east. There was a shallow cache pit in the floor of the entrance passage.

Firepit: An irregular, centrally located basin.

Floor pits: Two undercut and eight straight-sided cache pits, one cache pocket.

Comments: This house had been burned.

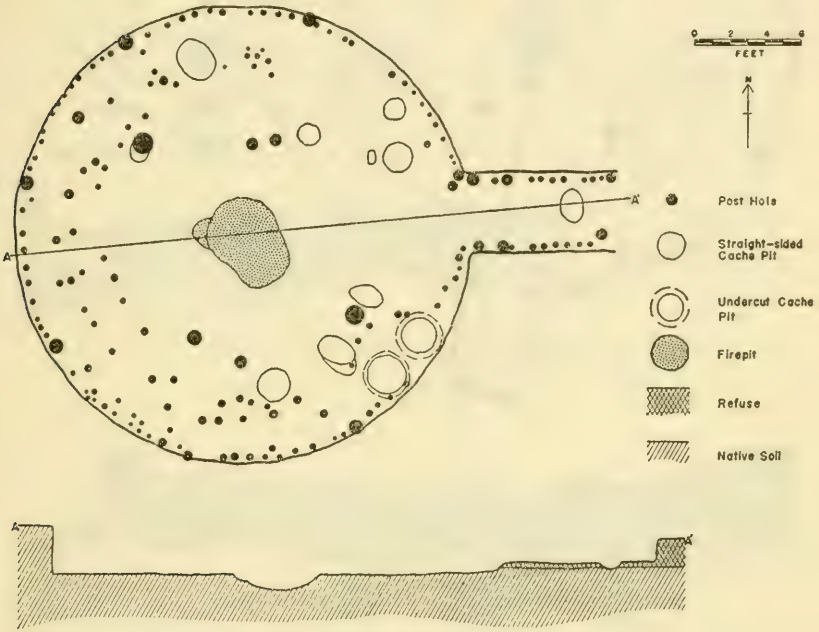

FIGURE 39.—Feature 3, Phillips Ranch site.

Feature 4 (fig. 40).

Shape: Circular.

Dimensions: Diameter, 36.2 feet; depth, 2.3 feet.

Pit walls: Unfaced refuse.

Floor: Tramped bottom of the pit. The central part of the floor was about 0.5 foot below the edges, so that the floor was surrounded by a bench from 4 to 5 feet wide.

Roof supports: Four single and multiple primary supports in a rough square around the firepit. Light wall posts with occasional heavier members at irregular intervals.

Entrance: Opening to the south. Logs had been set horizontally in the ground across the outer end and part way along the east side of the entrance passage.

Firepit: Centrally located basin filled with whitish ash.

Floor pits: One undercut and one straight-sided cache pit.

Comments: There were no indications that this house had been burned.

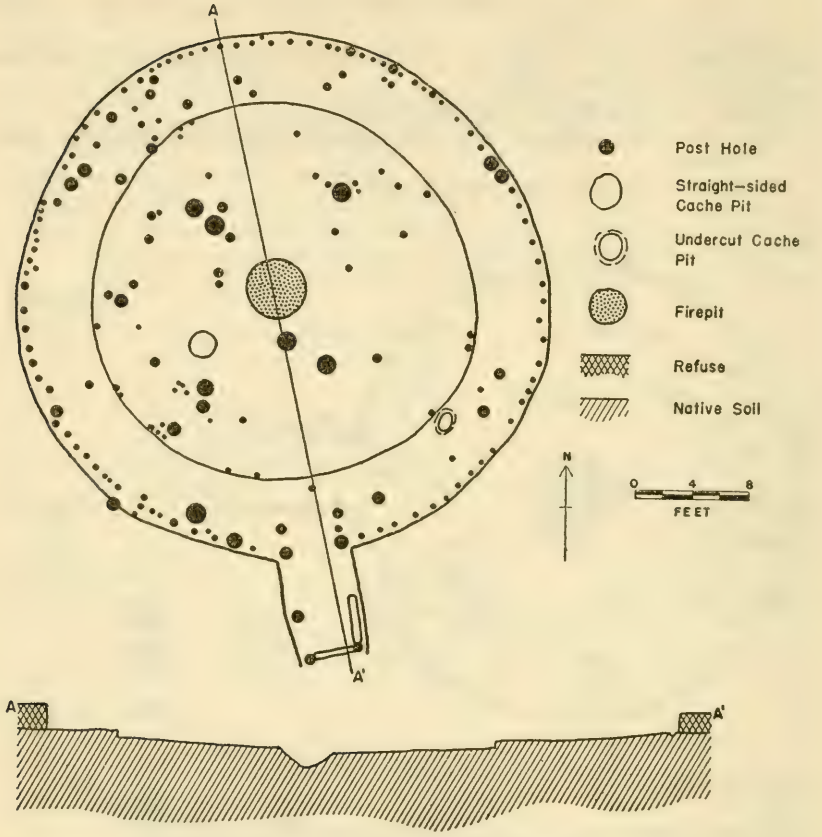

FIGURE 40.—Feature 4, Phillips Ranch site.

Feature 5 (fig. 41).

Shape: Circular.
Dimensions: Diameter, 29.8 feet; depth, 2.4 feet.
Pit walls: Unfaced refuse and native soil.
Floor: Tramped bottom of the pit.
Roof supports: There appeared to be six primary supports set in two concentric arcs on the east and west sides of the fireplace. Wall posts were somewhat larger than in the other houses at the site and were set farther apart. Again there is a suggestion of a concentric circle of posts several feet in from the wall.
Entrance: Opening to the east.
Firepit: A centrally located basin filled with whitish ash.
Floor pits: Eleven undercut and six straight-sided cache pits.
Comments: This house had been burned.

Feature 7 (fig. 42).

Shape: Circular.
Dimensions: Diameter, 33.1 feet; depth, 1.8 feet.
Pit walls: Unfaced refuse.

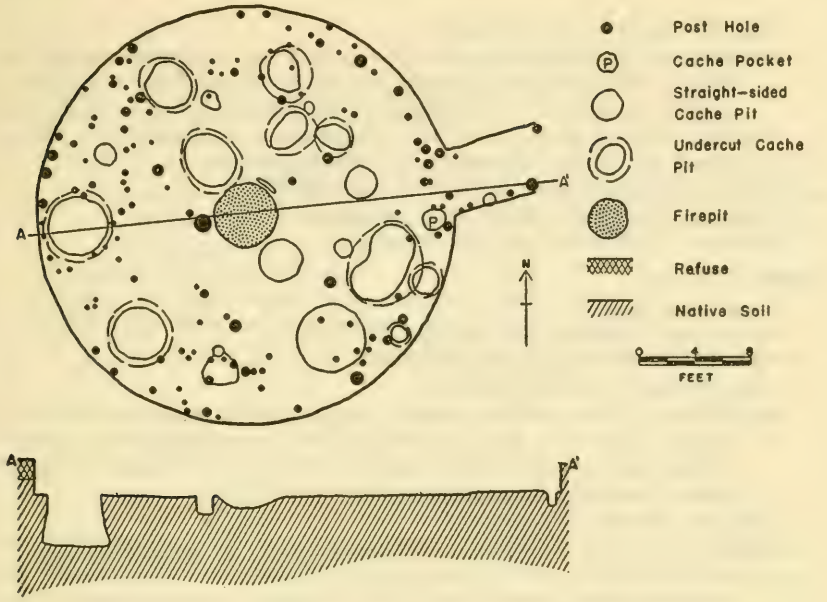

FIGURE 41.—Feature 5, Phillips Ranch site.

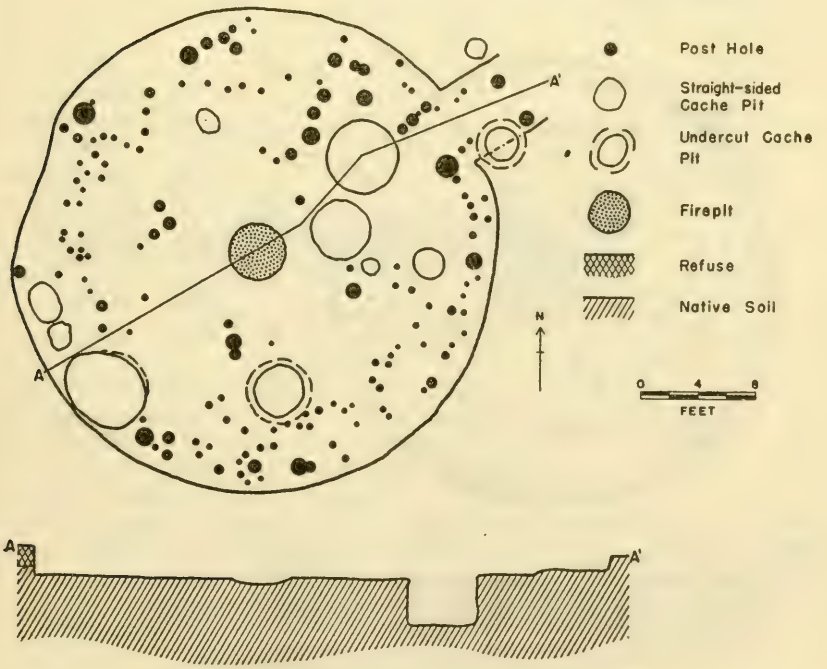

FIGURE 42.—Feature 7, Phillips Ranch site.

Floor: Tramped bottom of the pit.

Roof supports: Four multiple primary supports set in a square around the firepit. Wall members consisted of a series of heavy posts set close to the pit wall and a zone of smaller posts extending out into the pit floor.

Entrance: Opening to the northeast. There was an undercut cache pit just east of and partly underneath the entrance passage.

Firepit: Centrally located basin filled with whitish ash.

Floor pits: Two undercut and eight straight-sided cache pits.

Comments: This house had been burned.

Feature 8 (fig. 43).

Shape: Circular.

Dimensions: Diameter, 32.3 feet; depth, 1.9 feet.

Pit walls: Unfaced refuse and native soil.

Floor: Tramped bottom of the pit.

Roof supports: Four multiple primary supports set in a square around the firepit. Light wall members with heavier ones interspersed at fairly regular intervals set against the pit walls, and an irregular concentric circle of posts set several feet in from the walls.

Entrance: Opening to the east.

Firepit: Central basin filled with whitish ash. At some time during the occupation of the house the firepit had been remodeled. The original basin had been partly cleared of ash, and plastered with clay so as to reduce the size.

Floor pits: Nine straight-sided cache pits.

Comments: This house had been burned.

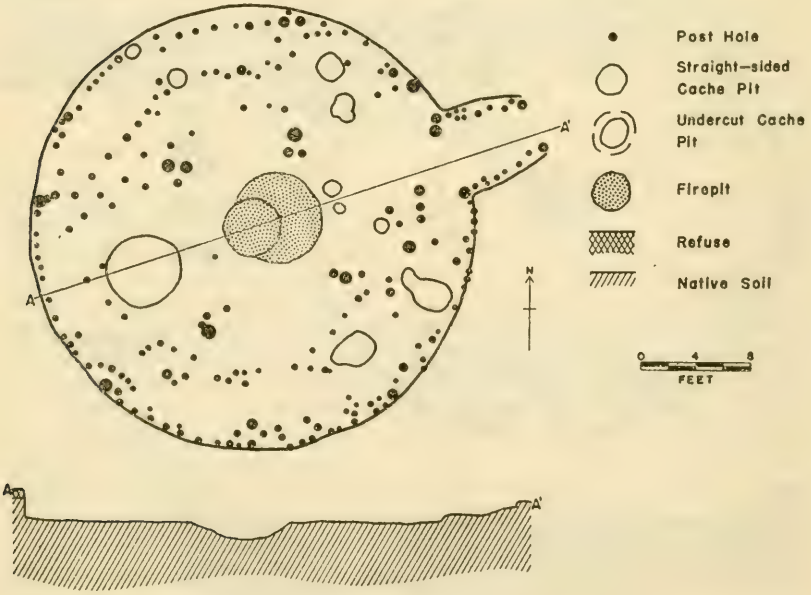

FIGURE 43.—Feature 8, Phillips Ranch site.

Feature 20 (fig. 44).

Shape: Circular.
Dimensions: Diameter, 31.8 feet; depth, 2.3 feet.
Pit walls: Unfaced refuse and native soil.
Floor: Tramped bottom of the pit.
Roof supports: Four single and multiple primary supports set in a square around the firepit. Wall posts included light members with heavy ones at fairly regular intervals between them, and a concentric circle of posts a few feet in from the wall.
Entrance: Opening to the east.
Firepit: Centrally located basin filled with whitish ash.
Floor pits: Three undercut and one straight-sided cache pits.
Comments: There were some indications that this house had been burned.

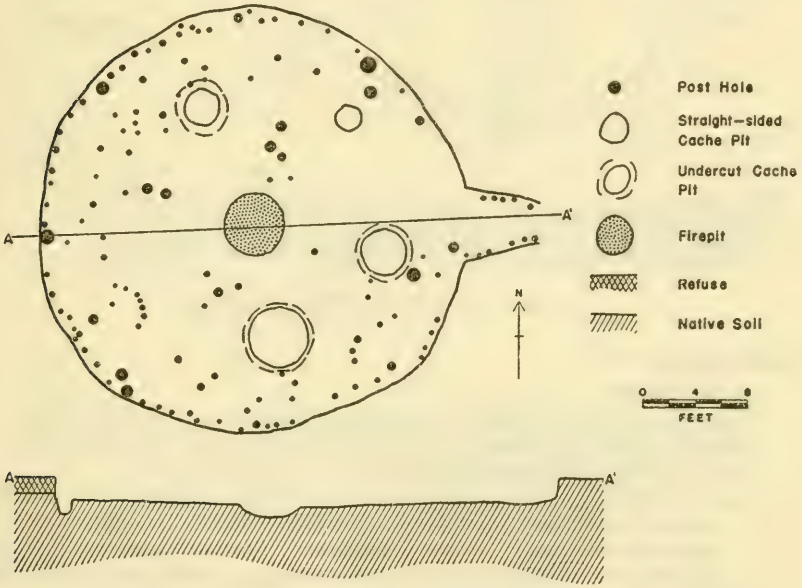

FIGURE 44.—Feature 20, Phillips Ranch site.

Feature 23 (fig. 45).

Shape: Circular.
Dimensions: Diameter, 39.1 feet; depth, 2.1 feet.
Pit walls: Unfaced refuse and native soil.
Floor: Tramped bottom of the pit.
Roof supports: Four single primary supports set in a square around the firepit. Wall posts consisted of light members with heavier ones interspersed at fairly regular intervals. The posts were set at the base of the pit wall. No inner circle of posts was present in this house.
Entrance: Opening to the east.
Firepit: Irregular centrally located basin filled with whitish ash.
Floor pits: Five undercut cache pits and one cache pocket.
Comments: This house had been burned.

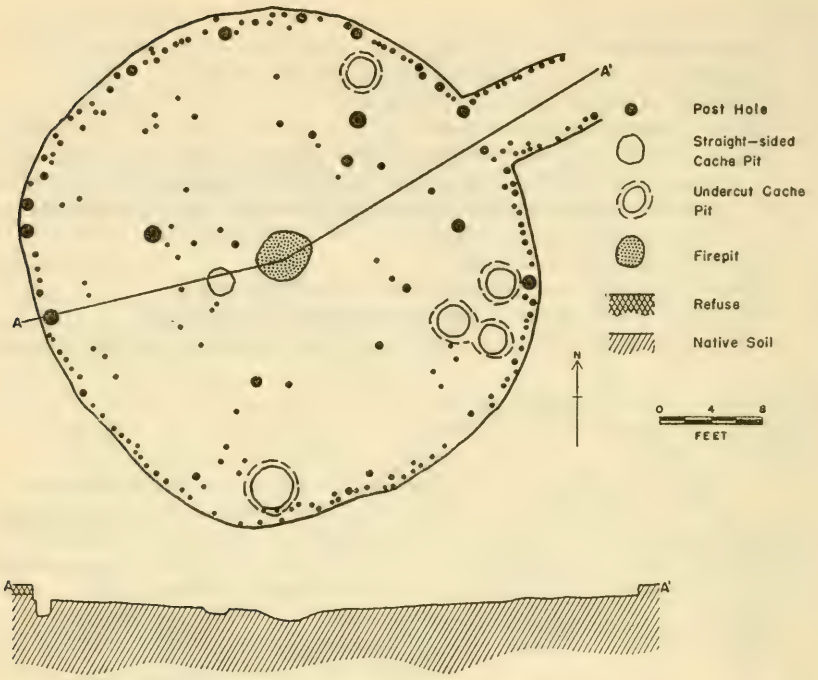

FIGURE 45.—Feature 23, Phillips Ranch site.

Feature 15 (fig. 46).

Shape: Circular.

Dimensions: Diameter, 48.4 feet; depth, 2.9 feet.

Pit walls: Unfaced refuse.

Floor: Tramped bottom of the pit.

Roof supports: Four single and multiple primary supports set in a square around the firepit. A fifth post had been set about midway between the southern pair of primary supports. The wall posts were set in a double row of light members with occasional heavy ones interspersed.

Entrance: Opening slightly north of east.

Firepit: Three shallow basins filled with whitish ash. Two of them were located near the center of the floor, and the third in line between the center of the floor and the entrance.

Floor pits: One basin-shaped cache in near the south wall of the house.

Comments:

Directly opposite the entrance there was an earthen "altar" 11 by 7 feet and 0.9 foot thick. The three sides within the house were beveled inward at the top. No offerings of any kind were found in association with this feature. The large size, deeper pit, central location in the village, and the presence of the "altar" all seem to indicate that Feature 15 had some specialized function, presumably similar to that of the historic Arikara ceremonial lodge.

Feature 15 had been extensively remodeled. An additional row of wall posts had been added around the southwest quadrant of the house, the new posts extending across the back of the "altar."

The "altar" itself had been enlarged by packing refuse-bearing earth at the front and sides. The entire "altar" had then been plastered, the only instance of the use of plaster at the site. The plaster partly to completely covered the holes left by one row of wall posts at the rear of the "altar," which seems to indicate that these posts were removed when the additional set was put in place.

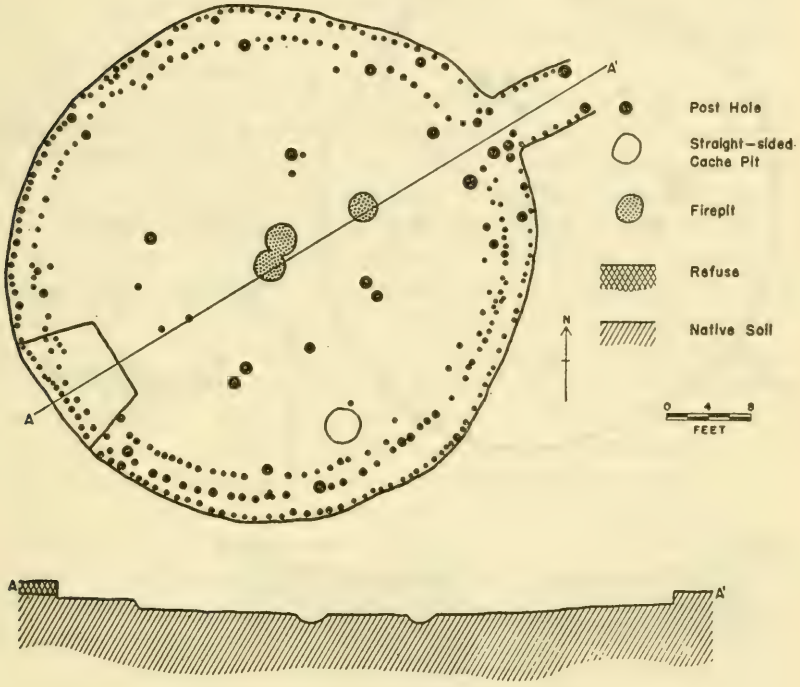

FIGURE 46.—Feature 15, Phillips Ranch site.

Feature 27 (fig. 47).

Shape: Circular.

Dimensions: Diameter, 21.5 feet; depth 2.3 feet.

Pit walls: Unfaced refuse and native soil.

Floor: Tramped bottom of the pit.

Roof supports: Four single and multiple primary supports set in a square toward the center of the floor. The post holes along the pit wall were very irregular, suggesting that some of the wall members may have rested directly on the pit floor.

Entrance: No trace of an entrance passage was found, in spite of the fact that a considerable area was stripped back on all sides of the house. This suggests the possibility of a doorway without an accompanying passage.

Firepit: None. A straight-sided pit approximately 3 feet in diameter and 1.5 feet deep occupied the center of the floor where the firepit is located in the other houses at the site.

Comments: Feature 27 was the only house at the site which was located outside the fortification ditch. Its location, its small size, the absence of a firepit and an entrance passage, and the scarcity and irregular placement of the post holes all suggest that it was a structure with some special function, possibly as a menstrual hut.

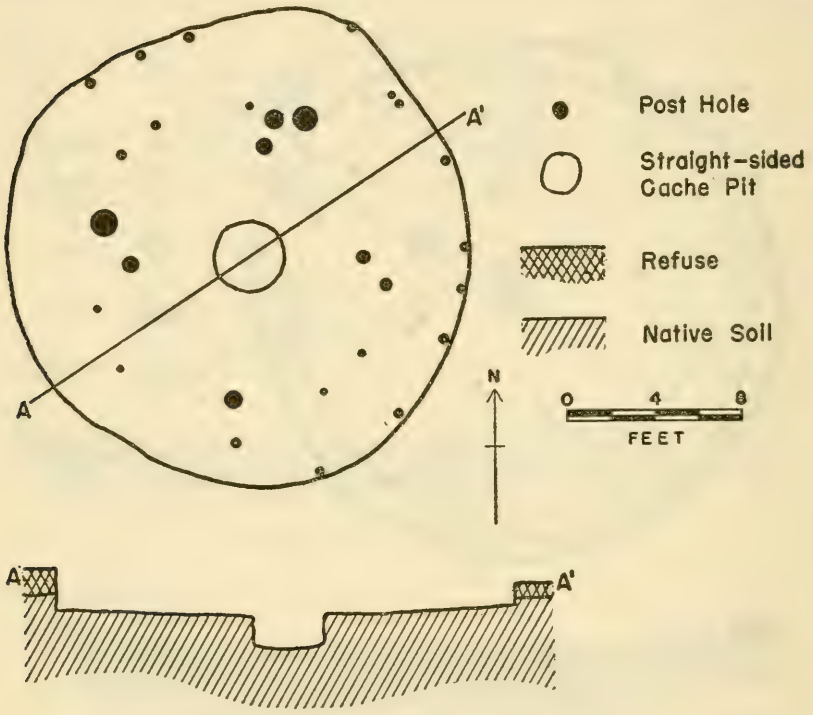

FIGURE 47.—Feature 27, Phillips Ranch site.

With the exception of Features 15 and 27, all of the houses excavated at the Phillips Ranch site conformed to the same general pattern. All of them were more or less circular with pits dug from 1.8 to 2.9 feet below the present ground surface. None of the pit walls was plastered. Floors were simply the tramped bottoms of the pits. All of the houses, except Feature 27, had entrance passages which were marked by more or less well-defined sets of post holes. Most of the entrances faced east, but the direction of the opening ranges from south to northeast. The variability in the orientation of the entrance seems to be primarily a function of the location of the house with regard to its neighbors or to the fortification ditch, entrances being rotated away from the east when it was necessary to avoid another structure.

Firepits were regular to irregular basins, located at the center of the floor. Post holes were identical in appearance with those found

at the Dodd site. Most of the houses had undercut and/or straight-sided cache pits in the floor. In several instances the pits were so large and so numerous that they took up a very large part of the available floor space. It seems possible that one of these pits was dug each year at harvest time, the one from the previous year having been refilled. Otherwise, the occupants of the structure would have had considerable difficulty in moving about the house. It was only possible to recognize holes which may have contained wooden mortars in a few of the houses.

There were indications of some individual variation in the details of the house superstructures, but most of them seem to have conformed to the same general pattern. The primary superstructure unit was a set of four single or multiple supports set more or less in a square around the central firepit. Wall members seem to have consisted of light posts with heavier ones interspersed at more or less regular intervals. The wall posts were usually set so they were close to or touched the sides of the house pit. All of the post holes were vertical or near vertical. The placement of the wall posts against the side of the pit may mean that some sort of "leaner" was run from the ground surface to stringers connecting the tops of the posts, but no trace of such a member was found during the course of excavation. The materials used in building the superstructure itself seem to have been identical with those used in the round houses at the Dodd site.

The post hole patterns in most of the houses have one feature which may or may not relate to the superstructure. This is the rough circle of post holes intermediate between the wall posts and the primary superstructure supports. It is possible that the posts set in these holes reached to the roof of the house. However, the occurrence of the earth bench surrounding the central part of the floor of Feature 4 suggests the possibility that the intermediate ring of posts may have supported some sort of wooden bench or sleeping platform.

Feature 15 is distinguished by its central position in the village, its unusually large diameter, and the presence of the "altar." It appears to be a structure which had some special function, presumably similar to that of Feature 25 at the Dodd site. Feature 27 at Phillips Ranch also appears to have had some special function, possibly as a menstrual hut.

THE CACHE PITS

A total of 107 pits which had presumably been used for storage purposes were found at the Phillips Ranch site. Seventy-one of them had been dug through the floors of the houses. The remainder were located outside the lodges.

There were three types of cache pit at the site; undercut and straight-

sided pits and the cache pockets which were essentially the same as those found at the Dodd site. Nine of the Phillips Ranch cache pits appeared to be deep basins with curved sides and bottoms. However, these may well be the lower portions of undercut pits whose upper parts were indistinguishable in the refuse blanket. Pit dimensions showed approximately the same range as those at the Dodd site.

The distribution of the various types of pits within the site is tabulated below. In evaluating this distribution, it should be borne in mind that the test trenches and stripping operation covered an area of about 645 square yards, and that the floors of the 10 houses excavated at the site covered a total area of approximately 1,000 square yards. Thus there was roughly one cache pit for every 14 square yards of house floor, and approximately one cache pit for every 19 square yards of excavated area outside the houses. Although similar data are not available for other excavated sites in the area, it is my impression that there was an unusually high proportion of cache pits per square yard of house floor at the Phillips Ranch site. The distribution was as follows:

Type:	*Intramural*	*Extramural*
Undercut	35	18
Straight-sided	25	7
Cache pockets	8	5
Basin-shaped	5	4
	73	34

BORROW PITS

Eight fairly large irregular pits excavated at the Phillips Ranch site have been classified as borrow pits on the assumption that they represent excavations from which earth was taken to cover the houses in the village. The pits ranged from 4.0 to 11.4 feet in length, and from 2.4 to 8.1 feet in width. Depths into the native soil ranged from 0.8 to 2.5 feet. It was impossible to determine from what level in the refuse mantle the pits had been dug. The fill of the pits contained very heavy concentrations of refuse.

FIREPITS

Five firepits which were outside any of the houses were excavated at the Phillips Ranch site. They were identical in appearance with those found in the house floors. Diameters ranged from 1.4 to 2.4 feet; depths from 0.2 to 0.5 feet. The firepits ranged in level from the top of the native soil to near the bottom of the root zone, and two of them were partly superimposed. Differences in the level within the refuse mantle seem to indicate that the outside firepits were used only for relatively short periods of time.

HEARTHS

At the Dodd site we found several masses of heat-fractured stone that presumably represented hearths. None of these features occurred at the Phillips Ranch site.

BURIALS

No burials were found in or associated with the Phillips Ranch site. Test trenches were dug on the point between the edge of the river terrace and the tributary draw just south of the site, and on the south side of the draw. None of these tests yielded any indications of a cemetery. The maintenance shops of one of the companies working on the dam were located just west of the village, and the contractor's men reported that no trace of burials had been found in the area while their buildings were being erected.

Occasional isolated human bones were found within the Phillips Ranch site itself. An adult mandible, a metatarsal, and a fragment of an immature mandible were found in the fill of the entrance passage of the house, Feature 2. Another adult mandible was found in an undercut cache pit (Feature 53) located in the floor of the house, Feature 7.

THE ARTIFACT MATERIAL

POTTERY

Over 90 percent of the 1,587 rim sherds from the Phillips Ranch site are assignable to the four types set up within the Stanley Braced Rim Ware at the Dodd site. The Dodd site pottery descriptions were written before the sherd material from the Phillips Ranch site was studied. The fact that pottery from another site is classifiable within the same framework seems to be an adequate demonstration of the validity of the Dodd site typology. This same fact also serves to justify the practice of setting up pottery types on the basis of material from a single component, with the tacit assumption that such types will be recognizable in other components in the area.

Stanley Braced Rim Ware

The paste, form, surface finish, and decorative elements of the Stanley types were identical at the Dodd and Phillips Ranch sites. However, there was a marked difference in the proportions of the individual types at the two sites, and a difference in the frequencies with which some of the various decorative elements appeared. The sherd counts of the Stanley Braced Rim Ware types from the Stanley Focus component at the Dodd site and the Phillips Ranch site are compared in tables 4 and 5.

TABLE 4.—*Stanley Focus and Snake Butte Focus pottery proportions at the Dodd and Phillips Ranch sites* [1]

Sherd type	Stanley Focus (Dodd site)		Snake Butte Focus (Phillips Ranch site)	
Body sherds:	*Number*	*Percent*	*Number*	*Percent*
Brushed	399	7.8	893	8.2
Simple stamped	3,799	74.2	8,845	81.8
Plain	852	16.6	853	7.9
Miscellaneous	72	1.4	224	2.1
Total	5,120	100.0	10,815	100.0
Rim sherds:				
Stanley Wavy Rim	188	43.5	242	15.5
Stanley Cord Impressed	80	18.5	447	28.2
Stanley Tool Impressed	98	22.7	382	24.1
Stanley Plain	29	6.7	367	23.1
Miscellaneous and unidentified	37	8.6	149	9.1
Total	432	100.0	1,587	100.0

[1] The Dodd site figures include only sherds from findspots assigned to the Stanley Focus and do not include sherds of varieties which showed a negative association with the Stanley Focus.

TABLE 5.—*Occurrences of the various decorative treatments on the Stanley Braced Rim types at the Dodd and Phillips Ranch sites* [1]

Decorative treatment	Stanley Focus (Dodd site)		Snake Butte Focus (Phillips Ranch site)	
	No.	*Percent*	*No.*	*Percent*
Stanley Wavy Rim	254	100.0	242	100.0
Stanley Cord Impressed:				
Horizontal cord impressed, plain interior	59	50.0	251	56.2
Horizontal cord impressed, diagonal impressed interior	28	23.7	63	14.1
Diagonal cord impressed, plain interior	18	15.3	81	18.1
Diagonal cord impressed, diagonal impressed interior	6	5.1	35	7.8
Horizontal cord impressed rim and neck	5	4.2	12	2.7
Diagonal cord impressed rim, horizontal cord impressed neck	2	1.7	5	1.1
Total	118	100.0	447	100.0
Stanley Tool Impressed:				
Diagonal incising, exterior and interior	61	41.2	42	11.0
Diagonal incising, plain interior	49	33.1	183	47.9
Impressed, plain interior	24	16.2	126	33.0
Herringbone	5	3.4	23	6.0
Horizontal incising	4	2.7	2	.5
Spurred	3	2.1	1	.3
Horizontal and diagonal incising	2	1.3		
Impressed and diagonal incising			5	1.3
Total	148	100.0	382	100.0

[1] Counts from the Dodd site represent the total sample from all findspots.

The body sherds from the Phillips Ranch site show a marked increase in the proportion of simple-stamped pieces over the sample from the Stanley component at the Dodd site. This increase is complemented by a decrease in the number of plain sherds at Phillips Ranch. There are also marked differences between the two components in the frequencies of the individual pottery types. Stanley Wavy Rim is the most common type in the Stanley component at

the Dodd site. It drops to slightly over 15 percent of the total sherds from the Phillips Ranch site. It is replaced there by a 10 percent increase in the Stanley Cord Impressed, and an even more marked increase (16 percent) in the proportion of Stanley Plain in the total sample.

Like the types themselves, the same decorative treatments are present at both sites. There is relatively little difference in the proportions of the decorative elements in the Stanley Cord Impressed samples from the two sites, but there is a very considerable difference in the decoration of the Stanley Tool Impressed. Diagonal incising on both the interior and exterior drops sharply in the Phillips Ranch sample, and is replaced by an increased number of rims with diagonal incising on the exterior only and by rims with circular impressions.

Miscellaneous

In addition to the differences between the proportions and the decoration of the Stanley Braced Rim types, there is a marked difference between the Stanley and Snake Butte components in the various miscellaneous sherds. The Stanley Focus component at the Dodd site yielded a total of 37 rim sherds which were unidentifiable or which could not be assigned to any type yet described for the Plains. Ninety of the 149 "miscellaneous and unidentifiable" rim sherds from the Phillips Ranch site were also unclassifiable. The remainder of this category at Phillips Ranch can be typed into the following two general groups.

TALKING CROW WARE

Thirty-eight of the miscellaneous sherds (2.1 percent of the total rim sherds from the site) are assignable to the Talking Crow Ware described by Smith (Smith, 1951). These pieces group into types as follows:

	Number	*Percent*
Talking Crow Straight Rim	21	55.3
Talking Crow Cord Impressed	10	26.3
Talking Crow Brushed	6	15.8
Talking Crow Indented	1	2.6
	38	100.0

A final group of 21 rim sherds and 2 restorable vessels appear to represent a type which has not been previously described. It has been tentatively set up as Colombe Collared Rim, subject to modification or discard on the basis of more complete data.

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COLOMBE COLLARED RIM

(Pl. 18)

(*Type sample: 21 rim sherds*)

Note: This type has not been placed within a ware.

Paste:

Tempering: Grit, diameters ranging from −0.5 to 2.0 mm. The appearance and composition (quartz, mica, and a little feldspar) suggest that the tempering material is a decomposed granite.

Texture: Medium to coarse.

Hardness: 3.0–4.0.

Color: Tan to dark gray; exterior surfaces often heavily carboned.

Form:

Overall shape: Jars with collared rims, constricted necks, rounded shoulders, and rounded bottoms.

Lip: Rounded, occasionally thickened by the addition of a small bracing fillet on the exterior surface.

Rim: All the rims are collared. The collars range from 24 to 55 mm. in height. Interior and exterior profiles are more or less parallel to each other, forming a straight or concave plane which extends downward and outward from the lip. The lower edge of the collar is marked by a fairly abrupt shoulder which forms the junction between the collar and the low curved neck. The bottom of the collar is sometimes scalloped. Below the neck, the vessel wall turns outward toward the shoulder. These rims might be contrasted with the rims of the Foreman types by describing them as Z-rims rather than S-rims, since the surface is flat or concave rather than convex.

Neck: A relatively low, constricted zone below the shoulder of the rim.

Shoulder: Rounded.

Base: Rounded.

Handles: One sherd (pl. 18, *f*) has a short tablike lug extending down from the lower edge of the collar in the same plane as the face of the collar itself. Two others have fractured areas which seem to indicate the presence of loop handles running from the base of the rim collar to the shoulder of the vessel.

Surface finish: Bodies simple stamped, some with extensive plain areas. The stamping on one of the restored vessels is vertical. Necks are plain or brushed vertically; interior surfaces are plain.

Decoration: The decoration is confined to the rim and lip. It is preponderantly cord impressed. Patterns consist of a series of horizontal lines, or a series of interlocking triangles filled alternately with horizontal and diagonal cord impressions. The cord-impressed zone is sometimes bordered by a series of punctations. Two pieces were decorated with diagonal broad-trailed lines, and one was plain except for a series of punctations at the base of the rim.

Remarks: A number of the pieces assigned to Colombe Collared Rim at the Phillips Ranch site show a considerable similarity to some Lower Loup sherds from Nebraska. The most striking difference is in the incised decoration on the Nebraska pieces and the predominantly cord-impressed decoration on the Phillips Ranch rims.

Miniature Vessels

(*3 specimens*)

Fragments of small jars, none complete enough to permit measurement; all appear to have been less than 50 mm. in height and maximum diameter.

ARTIFACTS OTHER THAN POTTERY

The majority of the artifacts from the Phillips Ranch site show a near identity with the groups assigned to the Stanley Focus component at the Dodd site. In the following descriptions, frequent comparisons are made to the Dodd site material, and the same Group designations have been used whenever applicable.

Chipped Stone

As at the Dodd site, a variety of different kinds of stone had been used for making the chipped artifacts. The proportions of the different kinds of stone are shown in table 6.

TABLE 6.—*Materials used for the manufacture of chipped-stone artifacts associated with the single component at the Phillips Ranch site and the three components at the Dodd site*

Material used	Snake Butte (Phillips Ranch site)		Stanley (Dodd site)		Anderson (Dodd site)		Monroe (Dodd site)	
	Number	*Percent*	*Number*	*Percent*	*Number*	*Percent*	*Number*	*Percent*
"Knife River Flint"	2	0.8	19	11.5	93	73.8	66	75.9
Light chalcedony	64	24.5	27	16.3	4	3.1	2	2.3
Chert	65	24.9	41	24.7	13	10.3	8	9.2
Red jasper	41	15.7	25	15.1	3	2.4	3	3.5
Yellow jasper	21	8.0	13	7.8	3	2.4	1	1.1
Brown jasper	23	8.8	14	8.4	0	0	0	0
Gray jasper	12	4.6	6	3.6	1	.8	0	0
Flint	19	7.3	13	7.8	3	2.4	4	4.6
Quartzite	8	3.1	4	2.4	3	2.4	2	2.3
Other	6	2.3	4	2.4	3	2.4	1	1.1
Total	261	100.0	166	100.0	126	100.0	87	100.0

ARROW POINTS

(50 specimens)

Dodd Group 1 (fig. 48); 17 specimens.

Side-notched, straight-sided triangular, maximum width at base, straight base; slightly concave or convex bases occur rarely. The notches are at right angles to the long axis, and are often very narrow.

Length: Mean 23 mm., range 21 to 24 mm.
Width: Mean 13 mm., range 11 to 14 mm.
Weight: Mean 1.0 gm., range 0.8 to 1.6 gm.

Dodd Group 2 (fig. 48); 30 specimens.

Triangular with straight or slightly concave edges, straight or concave bases. Maximum width at base.

Length: Mean 24 mm., range 19 to 29 mm.
Width: Mean 14 mm., range 12 to 17 mm.
Weight: Mean 1.0 gm., range 0.6 to 1.3 gm.

Miscellaneous (fig. 48); 3 specimens.

Form differs from that of the two major groups at the site. All three are small and light, and presumably were used as arrow tips.

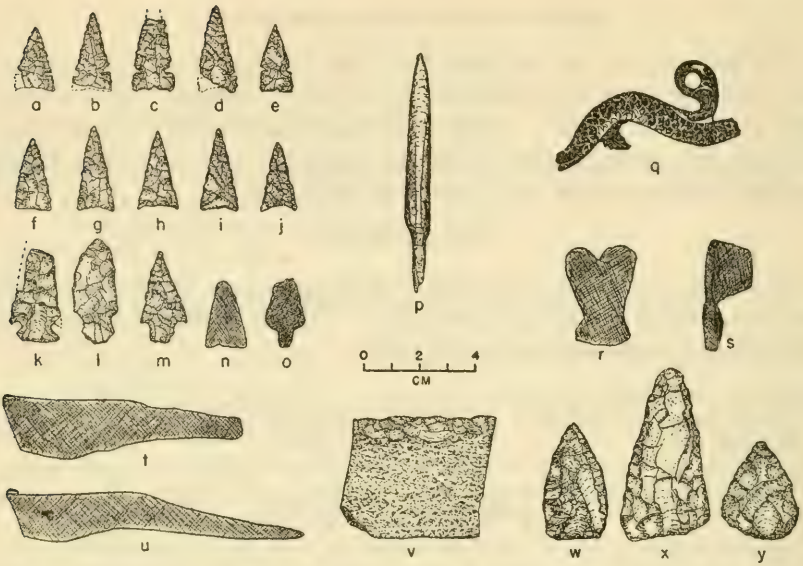

FIGURE 48.—Arrow points, gun parts, and knives, Phillips Ranch site. *a–e*, Arrow points, Dodd Group 1; *f–j*, Dodd Group 2; *k–m*, miscellaneous; *n*, *o*, iron; *p*, bone; *q*, brass musket side plate; *r*, unclassified; *s*, musket trigger; *t*, *u*, clasp knife blades; *v*, knife, Dodd Group 5; *w–y*, knives, Dodd Group 4.

DRILLS

(1 (?) specimen)

A single fragment which may have come from the blade of an expanded base drill.

KNIVES

(76 specimens)

Dodd Group 4 (fig. 48); 23 specimens.

Crude triangular to convex-sided triangular with flat or slightly convex bases.

Length: Mean 34 mm., range 27 to 61 mm.

Maximum width: Mean 21 mm., range 15 to 31 mm.

Dodd Group 5 (fig. 48); 42 specimens.

Chalcedony or milky quartz plates broken into roughly geometrical forms, one edge sharpened by pressure flaking.

Blade length: Mean 82 mm., range 50 to 141 mm.

Width: Mean 49 mm., range 34 to 68 mm.

Group 6; 11 specimens.

No whole pieces found. The fragments appear to come from relatively long, narrow, leaf-shaped blades. Several pieces made from plate chalcedony.

Length: No data, apparently over 80 mm.

Width: Mean 26 mm., range 15 to 36 mm.

END SCRAPERS

(131 specimens)

Dodd Group 3 (fig. 49); 61 specimens.

Comparatively large, irregular outline, more or less triangular cross section with maximum thickness adjacent to cutting edge. Convex surface percussion

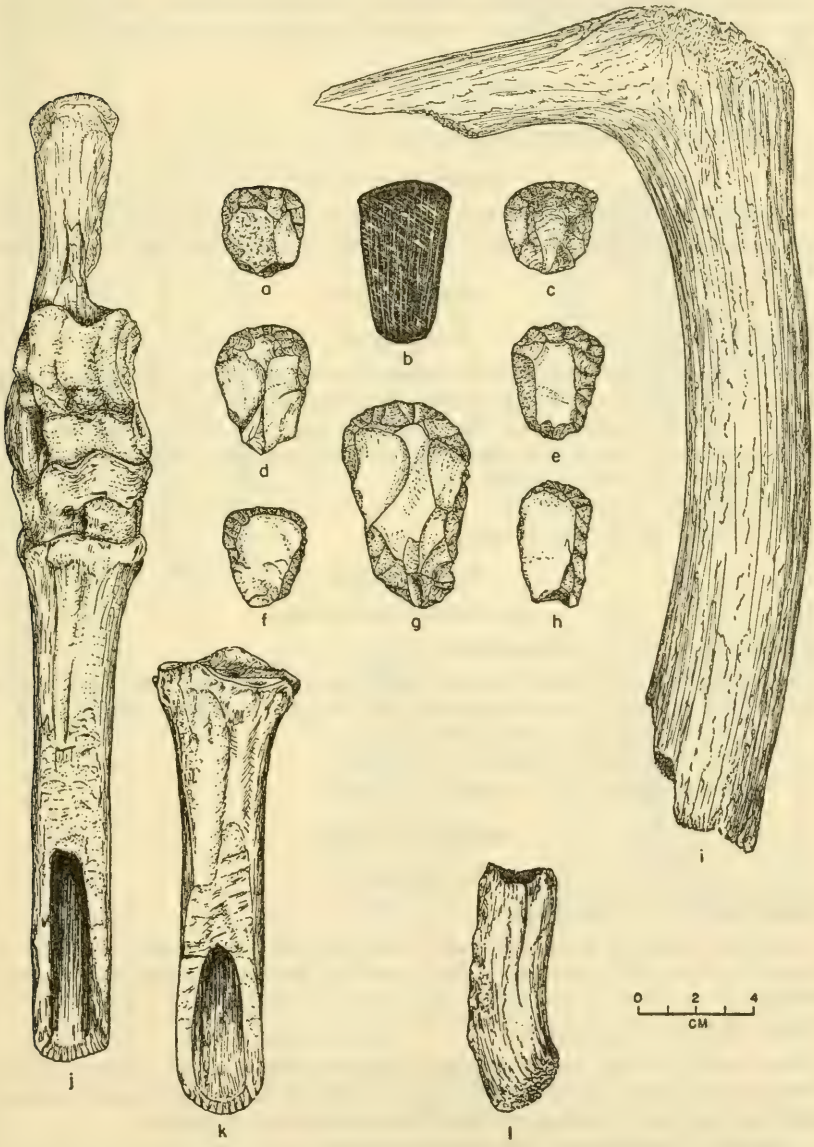

FIGURE 49.—End scrapers, elk antler scraper handle, fleshers, and problematical object, Phillips Ranch site. *a*, *c–h*, End scrapers; *b*, iron chisel; *i*, scraper handle; *j*, *k*, fleshers; *l*, socketed antler fragment.

flaked with flakes generally parallel to long axis; cutting edge carefully prepared by pressure flaking.

Length: Mean 37 mm., range 22 to 56 mm.
Width: Mean 27 mm., range 13 to 43 mm.
Thickness: Mean 11 mm., range 6 to 17 mm.

Dodd Group 5 (fig. 49); 70 specimens.

Comparatively large, irregular outline, upper surface consisting of two or more large flake scars. Sides seldom retouched, cutting edges formed by pressure flaking.

Length: Mean 32 mm., range 21 to 46 mm.
Width: Mean 25 mm., range 20 to 31 mm.
Thickness: Mean 7 mm., range 4 to 11 mm.

HAMMERSTONES (?)

A few battered nodules were found in the excavations, but none were reduced to the point that it was possible to say that the battering was not due to stream action.

LARGE BLANKS

(3 specimens)

Large, roughly leaf-shaped blades made from quartzite by percussion flaking. It was impossible to determine whether these pieces were used as tools, or were just raw material brought into the village for later use. There were, however, no signs of use on any of the edges which might have been used for cutting.

Lengths: 115, 130+, and 155 mm.
Widths: 52, 54, and 54 mm.
Thickness: 23, 23, and 27 mm.

Ground Stone

ARROW-SHAFT SMOOTHERS

Dodd Group 1 (fig. 50); 26 specimens.

Small, short, partly shaped pieces of sandstone with one grooved surface; groove runs down long axis; grooved surface ranges from flat to slightly convex.

Length: Mean 56 mm., range 39 to 81 mm.
Width: Mean 33 mm., range 21 to 46 mm.
Thickness: Mean 17 mm., range 8 to 28 mm.

SHARPENING STONES

(10 specimens)

Group 1 (fig. 50); 3 specimens.

Irregular pieces of sandstone and scoria; two or more narrow to broad V-shaped grooves which appear to have resulted from sharpening pointed bone tools.

Group 2 (fig. 50); 7 specimens.

Thin oval pieces of medium-grained sandstone with a single V-shaped groove down the long axis. Except for the cross section of the groove, these pieces are indistinguishable from the arrow-shaft smoothers found at the site.

Length: Mean 80 mm., range 58 to 111 mm.
Width: Mean 31 mm., range 21 to 45 mm.
Thickness: Mean 18 mm., range 13 to 23 mm.

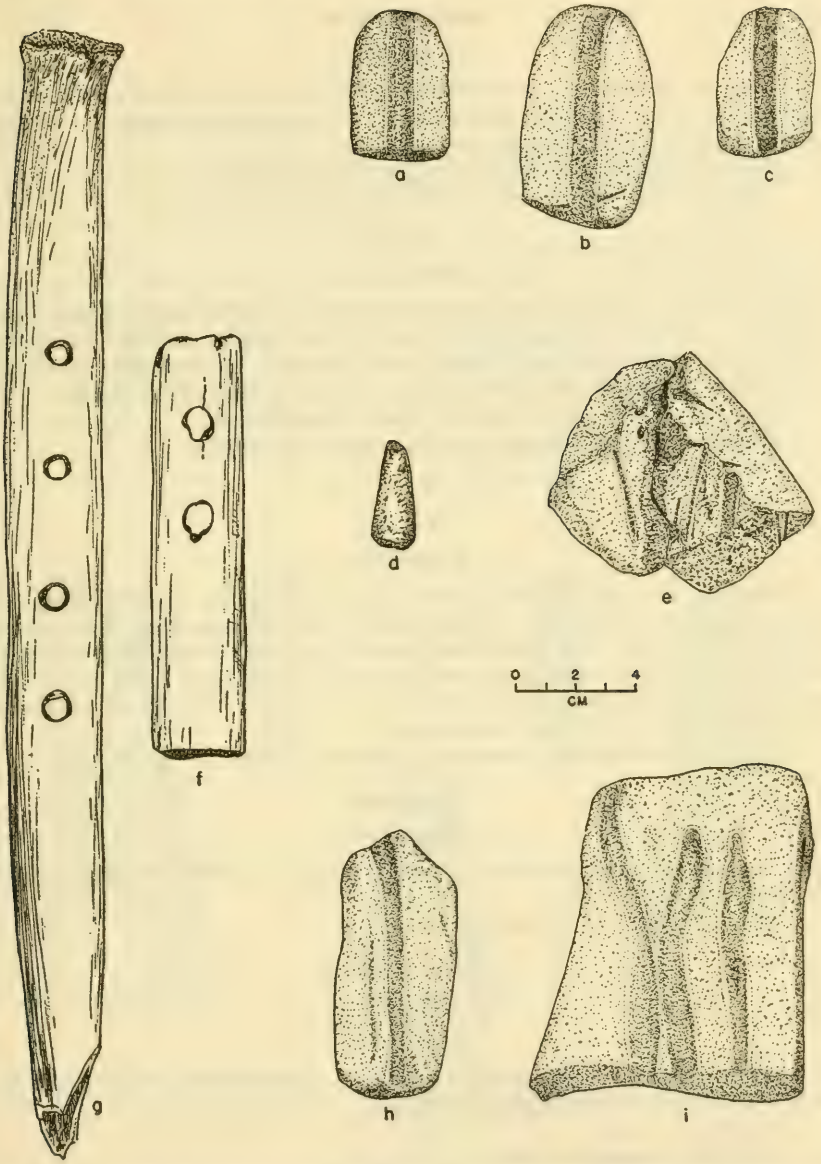

FIGURE 50.—Arrow-shaft smoothers, arrow-shaft wrenches, scoria reamer, and sharpening stones, Phillips Ranch site. *a–c*, Arrow-shaft smoothers; *g*, *f*, arrow-shaft wrenches; *d*, scoria reamer; *e*, *h*, *i*, sharpening stones.

WHETSTONES

(53 specimens)

Irregular pieces and slabs of scoria and fine- through coarse-grained sandstone; pieces have one or more smooth facets which appear to have been developed by using the stone as an abrader.

RUBBING STONES

(*11 specimens*)

Waterworn pebbles and small cobbles with slight to moderate polish on one flat surface; polished surfaces tend to be uneven, suggesting use against a resilient material rather than against another stone.

Maximum diameter: Mean 63 mm., range 43 to 108 mm.

Maximum thickness: Mean 41 mm., range 28 to 79 mm.

MAULS

(*15 specimens*)

Full grooved; ends vary from blunt through rounded to blunt-pointed; cross sections vary from triangular with rounded corners through circular to irregular. Apparently made from cobbles which were naturally more or less the desired shape, and which were altered by pecking over all or part of the surface.

Maximum length: Mean 136 mm., range 80 to 186 mm.

Maximum diameter: Mean 105 mm., range 43 to 138 mm.

PIPES

(Fig. 52)

(*6 specimens*)

Catlinite. The one complete specimen was an elbow pipe with a bowl 30 mm. high and a stem 20 mm. long. It presumably had a supplementary stem of some perishable material. One other bowl fragment apparently came from this same kind of pipe. Three reasonably complete stems range from 50 to 73 mm., in length, and also appear to have come from elbow pipes. Two of the long stems had pierced decorative ridges on the tops.

Maximum outside bowl diameters: (Equal-arm elbows) 17 and 19 mm.

STONE BALLS

(*3 specimens*)

Roughly spherical balls of stone; 1 quartz, 1 granite, 1 scoria. These all appear to be manufactured pieces.

Mean diameters: 31, 35, and 37 mm.

SCORIA REAMER

(Fig. 50)

(*1 specimen*)

A piece of scoria with a bulbular base and a tapered stem which may have served as a reamer for enlarging drilled holes.

Length: 37+ mm.

Maximum diameter: 15 mm.

Minimum diameter: 8 mm.

ANVIL

(*1 specimen*)

A long piece of stone with an oval cross section. Flat sides battered and cut as if the stone had been used as an anvil.

Length: 158 mm.

Maximum diameter: 69 mm.

Minimum diameter: 41 mm.

Bone and Horn

HOES

(118 specimens)

Dodd Group 1; 8 specimens.

Bison scapulae with the spines and ridge on the posterior border partly or completely removed; cutting edge may be round or square; glenoid cavity unmodified.

Dodd Group 2 (fig. 51); 103 specimens.

Bison scapulae with scapular spine and the ridge on the posterior border partly or completely removed; cutting edge may be rounded or square, and often shows signs of use after a jagged break had developed. All of these pieces have been chopped through at the neck so as to remove the glenoid cavity. There are occasionally more or less circular worn areas on the coastal surface of the neck which seem to be the result of the end of the handle rubbing against the bone.

Miniature (fig. 51); 2 specimens.

One made from a deer, the other from a dog scapula; both have the glenoid cavity removed by cutting through the neck of the bone. Probably toys.

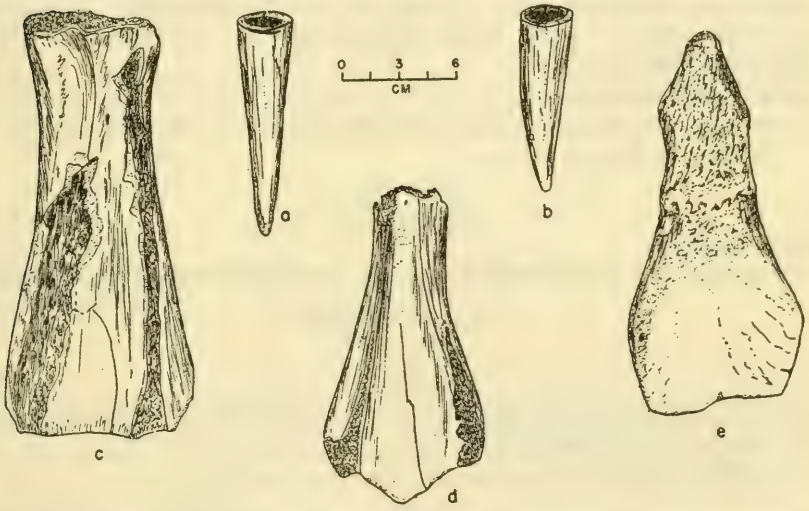

Figure 51.—Hoes, horn scoops, and snow snakes, Phillips Ranch site. *a*, *b*, Snow snakes; *c*, scapula hoe; *d*, miniature hoe; *e*, horn scoop.

HORN SCOOPS

(Fig. 51)

(10 specimens)

Made from the base of a bison horn and the adjacent part of the frontal bone which was cut to shape and sharpened to a working edge. The working edge has a high polish which may indicate use as a hoe.

SNOW SNAKES

(Fig. 51)

(*5 specimens*)

Large tines cut from deer antlers; deep, tapered, oval sockets in the cut ends; tips show considerable polish. These pieces are very similar to those figured by Culin (1907, figs. 536–539 and 542) which were used as javelin heads or which had feathers attached to the socketed end. Both the javelins and the feathered pieces were used in various forms of the "snow-snake" game.

Length: Mean 117 mm., range 97 to 138 mm.

Hole diameters: Mean 15 mm., range 12 to 16 mm.

AWLS

(*31 specimens*)

Dodd Group 2; 20 specimens.

Made from the edges of bison ribs usually cut so as to include some of the cancellous tissue. Having been cut from the edge of the bone, these pieces have a circular or triangular cross section.

Lengths of 3 whole specimens: 83, 86, and 138 mm.

Dodd Group 6; 8 specimens.

Made from rough and irregular splinters of buffalo ribs and long bones, unworked except for the tip which is ground to a smooth sharp point. Apparently considerable range in length. Single whole specimen 233 mm. long; at least two pieces were longer than this.

Group 7; 3 specimens.

Bird bones split through the head and shaft; shaft worked to a sharp point.

Lengths: 94, 96, and 141 mm.

PUNCHES

(*2 specimens*)

Dodd Group 4.

Made from ends of deer antler prongs, the end showing definite signs of wear.

QUILL FLATTENERS

(Fig. 52)

(*1 specimen*)

Split and polished segment of buffalo rib; cancellous tissue partly ground down; decorated with narrow incised lines.

Length: 119 mm.

Width: 14 mm.

FLESHERS

(Fig. 49)

(*9 specimens*)

Dodd Group 1 (fig. 49).

Made by cutting the shaft of a bison metatarsal diagonally so as to produce a chisel edge. Seven pieces had serrated or toothed cutting edges, one had a smooth cutting edge, and the cutting edge was broken off the ninth specimen. The proximal end of the bone was left intact. One piece was found with the tarsal bones articulated to serve as a handle, and it seems likely that they were left in place on other specimens of this group.

Lengths: 164 and 182 mm.

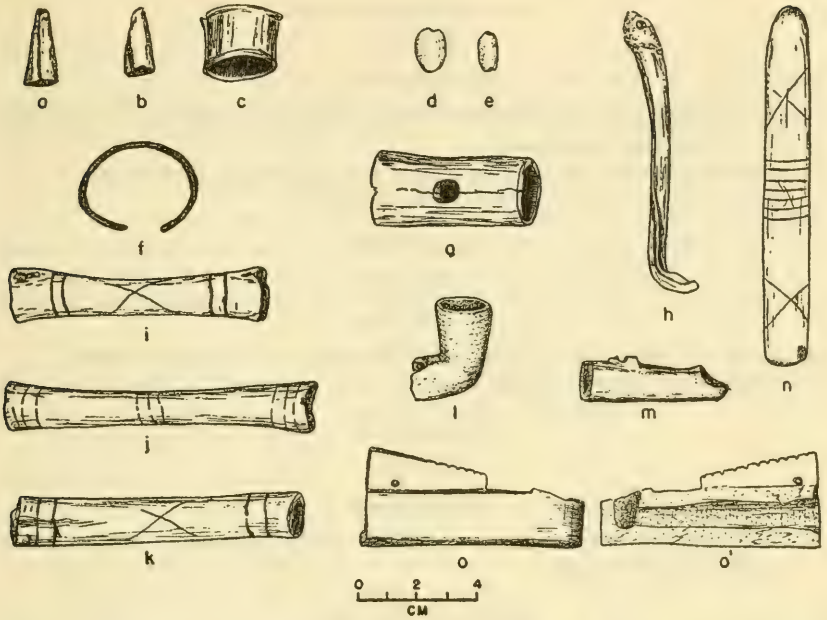

FIGURE 52.—Miscellaneous artifacts, Phillips Ranch site. *a*, *b*, Brass tinklers; *c*, brass ring; *d*, *e*, glass beads; *f*, brass bracelet; *g*, whistle; *h*, penis-bone pendant; *i–k*, incised bone tubes; *l*, *m*, *o*, *o'*, catlinite pipes; *n*, quill flattener.

HIDE GRAINERS

(14 specimens)

Heads of bison humeri cut from the bone so that a large area of cancellous tissue is exposed.

SCAPULA SCRAPERS

(6 specimens)

Long, straight-sided fragments of a bison scapula which had been worked into scrapers with one sharp and one blunt edge. In some cases the piece was cut from the posterior border with the ridge either left intact or partly cut away. In others it was cut so that the scapular spine formed one edge, or was cut from the central part of the blade.

Length: Mean 206 mm., range 184 to 222 mm.

Width: Mean 62 mm., range 54 to 106 mm.

KNIFE HANDLES

(7 specimens)

Segments cut from the ventral ends of bison ribs and grooved along one edge to allow for the insertion of a metal knife blade. The two whole specimens measure 148 and 190 mm. in length. One of the broken pieces was originally well over 200 mm. long.

ARROW-SHAFT WRENCHES

(Fig. 50)

(*19 specimens*)

Made by drilling a series of holes of different diameters through a section cut from the ventral end of a bison rib.

Length single whole specimen: 144 mm.; some others had been longer.

Hole diameters: Mean 14 mm., range 11 to 15 mm.

BONE TUBES

(Fig. 52)

(*13 specimens*)

Segments cut from dog (?) bones, seven decorated with fine line incising.

Length: Mean 86 mm., range 41 to 110 mm.

WHISTLES (?)

(Fig. 52)

(*2 specimens*)

Short bone tubes with circular holes drilled through one side.

Lengths: 53 and 69 mm.

ANTLER SCRAPER HAFTS

(Fig. 49)

(*3 specimens*)

L-shaped pieces of elk antler; rounded end on long leg; bevel on short leg to which a scraping blade was presumably lashed.

TENONED BONE ARROW POINT

(Fig. 48)

(*1 specimen*)

Sliver cut from the edge of a bison rib and fashioned into an arrow point with a long tapered blade and a short tapered tenonlike stem.

Blade length: 64 mm.

Stem length: 19 mm.

Ornaments

BONE

Drilled penis bone (fig. 52); 1 specimen.

Raccoon penis bone drilled for suspension.

Claw pendant; 1 specimen.

Hawk (?) claw drilled for suspension.

SHELL

No worked shell of any sort was found at the Phillips Ranch site.

GLASS

Beads (fig. 52); 3 specimens.

One "seed bead," and two more or less ovoid beads from 10 to 12 mm. in length. The latter pieces were made of a milky glass, and appeared to be identical with the white glass beads from the Dodd site.

Metal Ornaments and Other Objects

Three metals were found at the Phillips Ranch site—brass, iron, and copper. Most of the pieces are unrecognizable fragments, but a few are definite artifacts. Some of these appear to be of native manufacture; the remainder are White products which were presumably traded directly or indirectly into the area.

BRASS

Bracelet (fig. 52); 1 specimen.

A thin, semicircular bracelet made from heavy brass wire.
Maximum diameter: 39 mm.

Tinklers (fig. 52); 2 specimens.

Small conical objects rolled of thin sheet brass, probably used as tinklers on a garter or the fringe of some other garment.
Lengths: 21 and 25 mm.
Maximum diameters: 9 and 11 mm.

Ring (fig. 52); 1 specimen.

Cylindrical brass ring with rolled edges.
Length: 18 mm.
Maximum diameter: 23 mm.

Gunstock side plate (fig. 48); 1 specimen.

A fragment of the dragon side plate attached to the stocks of rifles made by several British firms during the latter part of the eighteenth century, and traded to North America by both the North West and the Hudson's Bay Companies.

Unidentifiable fragments; 15 specimens.

IRON

Knife blades (fig. 48); 3 specimens.

Long tapered blades with transverse pins at the base of the blade which suggest that they come from clasp knives. Undoubtedly of White manufacture.

Chisel (fig. 49); 1 specimen.

A thin piece of iron with one rounded end, and a wide slightly convex end that had apparently been sharpened to a cutting edge.
Length: 56 mm.
Width: 32 mm.

Needles or awls; 2 specimens.

Arrow points (fig. 48); 2 specimens.

Cut from sheet iron, one triangular, one stemmed.

Gun parts (fig. 48); 2 specimens.

A trigger, and an unidentified musket part.

Unidentifiable fragments; 46 specimens.

COPPER

Tubular bead; 1 specimen.

Rolled from sheet copper.
Length: 9 mm.
Diameter: 4 mm.

Unidentifiable fragment; 1 specimen.

PERISHABLES

Basketry (pl. 19); 4 fragments.

Coiled, three pieces with 3-rod foundations sewn with an interlocking stitch. The rods appear to be small twigs; the stitching material consists of long strips of cedar bark or the inner bark of a willow tree. The fourth piece is also coiled with an interlocking stitch, but the foundation of the coil consists of a bundle of what appears to have been the inner bark of a willow rather than the small twigs.

A larger basketry fragment was found with Burial 1 at Site 39ST15. It is similar to the pieces from the Phillips Ranch site with a 3-rod foundation.

Pot rest; 1 specimen.

Approximately half of a doughnutlike ring made of cedar (?) bark. The ring consists of a core of concentric pieces of bark with a radial wrapping. The form of the specimen is very reminiscent of the skull rests used by many physical anthropologists.

Outside diameter: Ca. 230 mm.
Width: Ca. 75 mm.
Thickness: Ca. 20 mm.

SUMMARY AND DISCUSSION

The data from the Dodd and Phillips Ranch sites and from the other excavated sites in the vicinity of the Oahe Dam make it possible to reconstruct at least part of the area's prehistory. Such a reconstruction can best be viewed against the background of the natural environment. Some aspects of the environment have probably undergone little or no change since the sites were occupied. Others, such as the climate and the particular location of the channel of the Missouri River, may have been quite different in the past. However, lacking any studies of such environmental changes, the present situation is the only one against which it is possible to project the earlier cultures.

ENVIRONMENT

There are three minor physiographic zones in the Oahe Dam area. One is the "upland," the rolling treeless plain into which the river valley is incised. The second consists of a series of eroded slopes and level terraces which lie between the abrupt edge of the upland and the present flood plain, and which are above all but the highest flood crests. It is the zone in which the old village remains of the area are located. The third physiographic zone is the flood plain

itself, a constantly shifting area bordering the meandering channel of the river, and including a number of islands in the river itself.

Core tests made and evaluated by geologists of the Corps of Engineers indicate that a series of different soils tend to equate with the three physiographic zones. The Pierre shale is the underlying formation for most of the region. In the uplands the shale is covered with a layer of glacier-deposited clays, silts, sands, and gravels which contain fairly numerous large erratics. The steeper slopes along the sides of the valley are either exposures of the underlying shale, or are mantled by a thin layer of glacial drift. The level terraces between the upland and the flood plain are mostly composed of a fine, tan, wind-laid silt. This formation is overlain or partly replaced by water-laid silts and decomposed shale near the mouths of the tributary draws. The flood plain is a series of water-laid silts, sands, and gravels.

There are two sharply contrasting native vegetation zones in the Oahe area. The uplands and terrace zone are covered with a variety of grasses whose roots mat together to form an extremely tough sod. The flood plain and the tributary draws have a heavy tree cover which presents a striking contrast. Varieties include willow and cottonwood, with some cedars, oaks, and other hardwoods. In the ecologist's terms (cf. Shantz and Zon, 1924) the uplands and terrace zone fall within Plains Grassland, whereas the flood plain is an extension up the Missouri Valley of the Oak-Hickory division of the Southern Hardwood Forest.

By most standards, the climate of the area is a harsh one. The maximum temperature range is from −40° to 115° F.; the January average 17.6°, the July average 76.3°. The average growing season, from killing frost to killing frost, lasts from April 30 to October 8, a period of 161 days. The average precipitation is 16.2 inches per year. This is mostly in the form of summer rains, with nearly 60 percent of the annual precipitation concentrated in the period from May through August. Snowfall tends to be comparatively light, with the maximum usually occurring in March. Mean monthly wind velocities are in excess of 8 miles per hour, with a mean of nearly 12 miles per hour for April. From October through April northwest winds may prevail, in May the winds are usually from the east, and from June through September from the southeast.

Variations in the stage of the Missouri River must also have affected the aboriginal population. Prior to the completion of the Fort Peck Reservoir in 1937, there were usually one or two sharp river rises in March and April, and a gradual rise in late spring which held through the latter part of July. The river was generally at its lowest stage during September and October.

One environmental change since the White penetration of the area is the severe depletion of the game supply. Hornaday's map (Hornaday, 1889) places the Oahe area near the eastern margin of the range of the "northern herd" of the American bison. The map indicates the herd's extinction in the Oahe district in the year 1886. In this connection, it is interesting to note that, during the early part of the twentieth century, a former owner raised bison on the land on which the Dodd and Phillips Ranch sites are located. Even before the destruction of the bison, the inroads of the European fur traders, first from Canada and later up the Missouri from St. Louis, had seriously depleted the supply of the smaller fur-bearing animals along the river. Today there are a few deer and small game animals in the district, and it is only during the seasons in which vast flocks of waterfowl migrate up or down the river that it is possible to visualize the supplies of game that must have been available in the past.

PREVIOUS EXCAVATIONS

There are a number of reports available on earlier archeological work in the Oahe Dam area. Unfortunately, much of the excavation and the publication was handicapped by a shortage of funds, and there is a minimum of comparative data available. Additional information was obtained by a study of the collections from the Thomas Riggs and La Roche sites which were made available by Dr. Wesley R. Hurt, Jr., of the museum of the University of South Dakota. Joan Howson (Mrs. Alden Clark) also contributed a copy of her thesis which describes the results of Columbia University's work at the Buffalo Pasture site.

The locations of the excavated sites in the Oahe Dam area are shown on map 1. Those on which some information is available include:

Arzberger (Strong, 1940, pp. 382–383).
Buffalo Pasture (Strong, 1940, p. 381; Howson, 1941).
La Roche (Meleen, 1948).
Meyer (Hoard, 1949).
Robinson [8] (George, 1949).
Sommers (Meleen, 1949 a; Hurt, 1951 a).
Thomas Riggs (Meleen, 1949 b).

During the summer of 1952 additional work was done at the Thomas Riggs site by Dr. Hurt, for the University of South Dakota, and at Buffalo Pasture by Franklin Fenenga, of the Smithsonian

[8] The pottery from the Robinson site indicates that there are at least two components at the village. Since the material was not segregated on this basis during excavation, the Robinson site has been omitted from the following discussion.

Institution. Fenenga also did a limited amount of work at Indian Creek village (39ST15), which is located a short distance downstream from the Phillips Ranch site. When the results of these excavations are available, they will provide a considerable amplification of the data presented here.[8a]

The Arzberger site appears to be culturally distinct from the others in the area, and will be discussed later. The remainder of the excavated sites in the vicinity of the Oahe Dam have been assigned to a series of foci which follow one another in time and which have been assigned to a larger taxonomic unit which has been called the Fort Pierre Branch (Lehmer, 1952 b).

The term "branch" and all of its implications are new to the Plains. The term has been borrowed from the current nomenclature of the Southwest where it is used to connote a cultural development through time within a limited geographic area, a cultural development characterized by the appearance of new traits, the modification of existing traits, and the disappearance of old traits, but still a development which is a continuum.

This situation seems to have existed in the Oahe area. As will be demonstrated later, each of the individual foci assigned to the branch is distinguished by its particular complex of traits. However, each focus shares a number of traits with its successor. These trait carryovers form a series of connecting threads which seem to demonstrate that the individual foci represent a cultural continuum through time. Throughout the sequence old traits are lost, new ones appear, and existing traits undergo various modifications. However, at no place is there a sharp break in the sequence such as one would expect if the area had been abandoned and later reoccupied by a group with a different culture. Because of this continuity, the various foci summarized here have been grouped into a "branch" rather than into one or more aspects.

The various foci have been ordered in time partly on the basis of the Dodd site stratigraphy and partly on the basis of the internal evidence provided by the trait complexes set up for the individual foci. The chronology of the Fort Pierre Branch is discussed in detail below.

Named foci have not been set up to include the material from the Thomas Riggs, Meyer, and La Roche sites. There is a comparatively small amount of data available on these horizons at present, and it has seemed advisable to let the establishment of named foci wait

[8a] Hurt's report on the Thomas Riggs site appeared while this paper was in press (Hurt, 1953), and provides additional information on the complex represented there.

upon further excavation. The various components of the Fort Pierre Branch are assigned to foci as follows:

The Fort Pierre Branch

Focus	*Component*
Snake Butte	Phillips Ranch and Buffalo Pasture sites
Stanley	Dodd site (upper)
?	Meyer and La Roche sites
?	Thomas Riggs site
Anderson	Dodd site (middle) and Sommers site
Monroe	Dodd site (lower)

There are some indications that unexcavated sites in the area may represent a still unrecognized horizon which is intermediate between the Meyer and La Roche sites and the Stanley Focus, but the existence of such a stage is still to be demonstrated.

THE CULTURAL COMPLEXES

When a comparison of the various components is made, it becomes apparent that many of the same traits occur in all the villages. However, there is a considerable difference in the particular form of the individual trait. It is possible to trace the modification of these common traits through time, and it is also possible to recognize the points in the cultural sequence at which new traits appear and at which older ones are lost.

The Monroe Focus, the earliest horizon at the Dodd site, is characterized by long-rectangular houses. The entrances were located in the southwest end, and consisted of an antechamber outside the house itself and a broad step inside the house pit. The firepits were located on the long axis of the house, but were offset from the midline toward the entrance. Houses characteristic of the succeeding horizon, the Anderson Focus, appear to stem from the same architectural tradition. They are also long-rectangular houses, and the details of the entrances and the location of the firepits are the same. However, there appears to have been a considerable difference in the type of superstructure. In the Monroe Focus houses, the holes which contained the wall posts were more or less evenly distributed around all four sides of the pit; in the Anderson Focus houses, the great majority of the wall posts were set parallel to the two long sides of the pit. Although the range in floor area of the two house groups overlapped, the mean for the Anderson Focus was somewhat greater than that for the Monroe Focus.

Two of the Anderson Focus houses at the Dodd site (Features 61–62 and 100) had one unusual feature. The outer portions of the floor were several inches higher than the center, and there was a sharp drop from the upper to the lower level. The first one excavated

(Feature 61–62) was originally assumed to represent two superimposed houses. However, the close alinement of the edges of the inner and outer sections of the floor and the lack of any indications of more than one entrance in either Feature 61–62 or Feature 100 seem to indicate that each feature was a single house in which the main part of the floor was surrounded by a low earth bench.

The single house excavated at the Thomas Riggs site, although larger than any of the Dodd site houses, conforms closely to the structural pattern of Features 61–62 and 100 at the Dodd site. It too is a long-rectangular structure with the entrance opening to the southwest. Apparently no evidence of an antechamber outside the pit was found, but a step similar to the ones in the Dodd site houses was present. As in the Anderson Focus houses, the great majority of the wall posts were set along the long sides of the pit. The central part of the floor was from 1.5 to 2.0 feet below the level of the sides and the northeast end. Meleen originally interpreted this feature as representing two superimposed houses. However, in view of the similarity to two of the houses at the Dodd site, it seems likely that the Thomas Riggs house is another structure with a bench surrounding the central part of the floor. Whether or not this is actually the case, the other similarities between the Thomas Riggs house and those assigned to the Anderson Focus at the Dodd site are so close that there can be no doubt that all of these houses represent the same basic architectural tradition.

The houses of the later components in the Oahe area show a distinct break with the earlier tradition. Circular structures appear at the La Roche and Meyer sites, and are also found in the Stanley component at Dodd site, the Phillips Ranch site, and the Buffalo Pasture site. House diameters range from 20 to 60 feet, there are four single or multiple primary roof supports set in a rough square around the centrally located firepit, and the covered entrance passages generally open to the east. As a group, the Phillips Ranch houses and the single house excavated at Buffalo Pasture stand somewhat apart from the earlier circular houses in the area. The late structures are distinguished by a much greater number of cache pits in the floors and by an increase in the number of wall posts. The latter change probably indicates some modification of the details of the house superstructure, but there is no information on the exact nature of the modification.

In summary, there are two distinct architectural traditions in the Oahe area. One is represented by the early long-rectangular houses, the other by the later circular houses. The change comes between the time of the occupation of the Thomas Riggs site and the occupation of the La Roche and Meyer sites. There is no evidence whatever

for a transition from the earlier to the later style of house, and the circular houses almost certainly represent a new trait borrowed from some foreign source.

There was considerable variation in the plans of the different villages. The long-rectangular houses of the Monroe and Anderson Foci were arranged in rows with open lanes between the rows. Mcleen's ground plan of the Thomas Riggs site shows an irregular grouping of houses, and there is no apparent plan to either the La Roche or Meyer sites. The Stanley and Snake Butte villages also show irregular grouping of the individual houses, but they cluster around one large structure at the center of the village. Thus, it appears that the change from villages with houses in regular rows to those with irregular groupings of the dwellings came between the end of the Anderson Focus and the occupation of the Thomas Riggs site.

There appear to have been two periods during which the villages of the Oahe area were fortified. The earliest fortifications seem to belong to the Anderson Focus. The sherd proportions from a test in the fill of the ditch which bounded the northern section of the Dodd site equate with those established for the Anderson component, and there can be little doubt that the fill of the ditch can be equated with the Anderson occupation (table 7). It might be argued that the ditch itself was dug during the Monroe occupation and filled during the succeeding period. However, the fact that most of the sherd material from the test was concentrated in the lowest 2 feet of the fill seems to indicate that there was some filling during Anderson Focus times, and that the almost sterile upper fill washed into the ditch during the period between the Anderson and Stanley occupations of the Dodd site. Thus, it would seem that the fortification ditch itself should be assigned to the Anderson Focus component. If that is the case, the earliest Dodd site village was unfortified, the middle one had a fortification ditch, and the final village was again unfortified.

TABLE 7.—*Body and rim sherds from Feature 71, a test pit in the fill of the fortification ditch at the Dodd site.*

Level (feet)	Sherds from Feature 71							
	Body sherds					Rim sherds		
	Brushed	Simple stamped	Plain	Cord roughened	Miscellaneous	Anderson High Rim	Anderson Low Rim	Total
0–1								0
1–2				5				5
2–3			21	11	4	1		37
3–4			10	60	2	1	1	74
4–4.4				3				3
Total			31	79	6	2	1	119

The Thomas Riggs, La Roche, and Meyer sites all appear to have been unfortified.

The Snake Butte Focus marks the second period of fortified villages in the Oahe area. The Phillips Ranch site, the Buffalo Pasture site, and a number of others in the vicinity are surrounded by fortification ditches, and there is some evidence that the ditches were reinforced with palisades. The ditch at the Phillips Ranch site was several feet deeper than the one at the Dodd site, and an even more significant difference is the plan of the fortification itself. The Anderson component at the Dodd site was confined to the top of a ridge protected on three sides by fairly steep slopes. The fortification ditch was a line across a narrow part of the ridge, and protected the fourth side of the village. The Phillips Ranch and Buffalo Pasture sites are surrounded by their fortification ditches. At the Phillips Ranch site the ditch completely encircles the area of occupation. At Buffalo Pasture, the village is located on the very edge of a high cut bank of the Missouri River. Today the fortification ditch forms a horseshoe around the area of occupation, with the open end at the river bank. However, there is evidence of considerable recent river cutting at this point, and it may be that originally the village was entirely surrounded by a ditch.

It has been impossible to demonstrate any structural change in the cache pits associated with the various components in the Oahe area. The available evidence seems to indicate that undercut and straight-sided cache pits and cache pockets associate with all of the known cultural complexes.

The various Oahe components are distinguished by a number of differences in the associated pottery. Monroe and Anderson body sherds are either plain or cord roughened, with an increase in the proportion of plain sherds in Anderson contexts. The majority of the Thomas Riggs sherds are plain, and cord roughening is largely replaced by simple stamping. The simple-stamped treatment is also characteristic of the later components of the area. During the Stanley Focus a fourth surface treatment was introduced. Earlier, vessel necks were either plain or simple stamped. Necks from the Stanley and Snake Butte Foci are marked with a series of vertical striations, apparently produced by brushing the plastic clay with a handful of coarse grass. This treatment was confined to the neck of the vessel, and the bodies continued to be either plain or simple stamped. Thus, the two distinctive changes in the treatment of vessel exteriors are the one from cord roughening to simple stamping which comes between the Anderson Focus and the horizon represented by the Thomas Riggs site, and the appearance of neck brushing in Stanley Focus times.

The individual pottery types are distinguished primarily by differences in the form and decoration of the vessel rim. In general, rim form seems to be a better diagnostic trait than decoration. Four basic rim forms occur—braced, direct, flared, and S-rims. The S-rims are those with a rounded bulge above a concave neck, and with interior and exterior profiles which follow approximately the same curve. Flared rims are straight, more or less the same thickness throughout, and flare sharply out above the vessel neck. Direct rims are similar to the flared pieces except for their vertical rather than out-sloping orientation. Braced rims surmount a rather high neck, and are distinguished by the addition of a fillet of clay which extends from the lip down onto the outside of the neck. The top of the fillet always blends into the lip; the bottom sometimes stands out from the neck or sometimes blends into it. Two minority pottery types have been characterized as having collared rims. The collars show a broad similarity to the S-rims, but are dissimilar in detail.

The Monroe and Anderson Foci are characterized by pottery types with flared or S-rims. The two types assigned to the Anderson Flared Rim Ware show positive associations with both the Anderson and the Monroe components at the Dodd site. There is little change in the proportion of Anderson Low Rim sherds associated with the two components, but the proportion of Anderson High Rim drops from 60 percent in the Monroe component to 33.1 percent in the Anderson Component. In addition to the change in the proportion of Anderson High Rim sherds, the Monroe and Anderson Foci are distinguished by the positive association of Monroe Collared Rim and Foreman Incised with the Monroe Focus, and their replacement by Foreman Cord Impressed in the Anderson Focus

The pottery from the Thomas Riggs site has never been classified into types. However, on the basis of Meleen's descriptions and an examination of the sherds themselves, it is possible to make some statements about the material. High and low flared rims and S-rims occur, all similar to those characteristic of the Anderson and Monroe Foci. A new form, the direct rim, also appears. Some of the flared rims are decorated with punctations in the angle between the lip and the exterior of the rim, and are indistinguishable from those of the Anderson High and Low Rim types. However, the Thomas Riggs vessels differ from the Anderson types in having plain or simple-stamped rather than cord-roughened bodies. Some of the S-rims from the Thomas Riggs site show a similarity to the earlier Foreman Cord Impressed and Foreman Cord Impressed Triangle types, having a decoration consisting of a series of horizontal cord-impressed lines, or horizontal cord-impressed lines broken by plain triangular areas which are bounded by two or three diagonal cord impressions. These

vessels must have had plain or simple-stamped bodies, in contrast to the cord-roughened bodies of the Foreman types.

The Anderson-like and the Foreman-like rims from the Thomas Riggs site seem to represent a carryover of the earlier pottery tradition in the Oahe area. The remainder of the Thomas Riggs rims represent innovations in form and/or design, innovations which accompany the replacement of cord-roughened by simple-stamped bodies. The new rim form is the direct variety. New decorative treatments include vertical punctations on the direct rims, broad trailing on S-rims, and a pinched ridge on the exterior of either flared or S-rims. Tabs or nodes projecting from the lip in the same plane as the vessel rim mark another innovation in the Thomas Riggs pottery.

The sherd material from the Meyer and La Roche sites has not been classified into types, but again the published descriptions and a study of the material itself permit some generalizations regarding the pottery from these two components. Body sherds are either plain or simple stamped, and there is a marked increase in the relative number of simple-stamped sherds over the proportions at the Thomas Riggs site. Flared rims were not found at either the Meyer site or the La Roche site, but S-rims are present at both. S-rims are decorated with interlocking triangular areas filled with diagonal broad trailed lines. These pieces represent the final known manifestation of the S-rim in the Oahe area.

The majority of the Meyer and La Roche rims are direct. Nearly all of them are decorated with a series of diagonal or herringbone impressions in the lip, impressions which were made with a tool held in a vertical position. In addition, a number of the rim exteriors are decorated with a series of horizontal broad trailed lines. The majority of the lips of the direct-rim pieces are the same thickness as the rim itself. The remainder of the lips have been slightly thickened by impressing the decorative elements or markedly thickened by finger pressure applied to widen the vessel lip. A number of these lips are thickened to such an extent that they are similar to and apparently foreshadow the braced rims which are characteristic of the pottery types associated with the Stanley and Snake Butte Foci.

The great majority of the sherds from the Stanley and Snake Butte components are assignable to the various types within the Stanley Braced Rim Ware. Body sherds are either plain or simple stamped, and there is a continued increase in the proportion of simple stamped to plain sherds. These two horizons are also marked by the first appearance of brushed necks. Almost every one of the rims is distinguished by the presence of a bracing fillet on the exterior. Decoration includes pinching to produce the Stanley Wavy Rim type, and the variety of cord and tool impressions which characterize the

Stanley Cord Impressed and Stanley Tool Impressed types. A few sherds of types assigned to the Talking Crow Ware (Smith, 1951) were found associated with the late component at the Dodd site and at the Phillips Ranch site. The pottery samples from the Stanley Focus component at the Dodd site and the Snake Butte component as represented by the Phillips Ranch site are distinguished by differences in the proportions of the individual types and in the frequency with which some of the particular decorative elements occur. The Phillips Ranch sample is also distinguished from the Stanley Focus material at the Dodd site by the appearance at Phillips Ranch of the Colombe Collared rim type.

In summary, it seems possible to recognize four "ceramic horizons" in the Oahe area (fig. 53). The earliest is represented by the Monroe and Anderson components at the Dodd site—a pottery complex characterized by vessels with cord-roughened bodies and flared or S-rims. The basic decoration of the flared rims is a series of indentations in the angle between the lip and rim. Monroe component S-rims are usually decorated with incised lines while those of the Anderson component are cord impressed. The succeeding horizon, represented by the Thomas Riggs site shows a carryover of some of the older ceramic traits and the introduction of a new series of traits. Flared and S-rims from the Thomas Riggs site are similar to those in the earliest horizon, and the tool-impressed and cord-impressed decorations are retained. However, body sherds are either plain or simple stamped, the direct rim appears, and pinched and broad trailed decorative motifs and scalloped lips come into use. During the period represented by the Meyer and La Roche sites, the flared rims seem to disappear, the S-rims have a new decorative treatment, and the direct rim which first appeared at the Thomas Riggs site becomes the dominant form. Decoration consists of vertical impressions on the lip and some horizontal broad trailing on the rim. A number of the Meyer and La Roche rims are thickened to the point that they seem to foreshadow the braced rims of the succeeding Stanley and Snake Butte Foci. The pottery of the latter horizons is distinguished by brushed necks and braced rims with pinched, cord-impressed, or tool-impressed decoration—the types which have been assigned to the Stanley Braced Rim ware described above.

The data on the nonpottery artifacts of the various Oahe components leave something to be desired. From the point of quantity, the Monroe, Anderson, Stanley, and Snake Butte components at the Dodd and Phillips Ranch sites yielded over 5,000 specimens. There are probably well under 500 specimens available from the other excavated components under discussion. Because of this disproportionate representation of the different complexes, statements regarding the

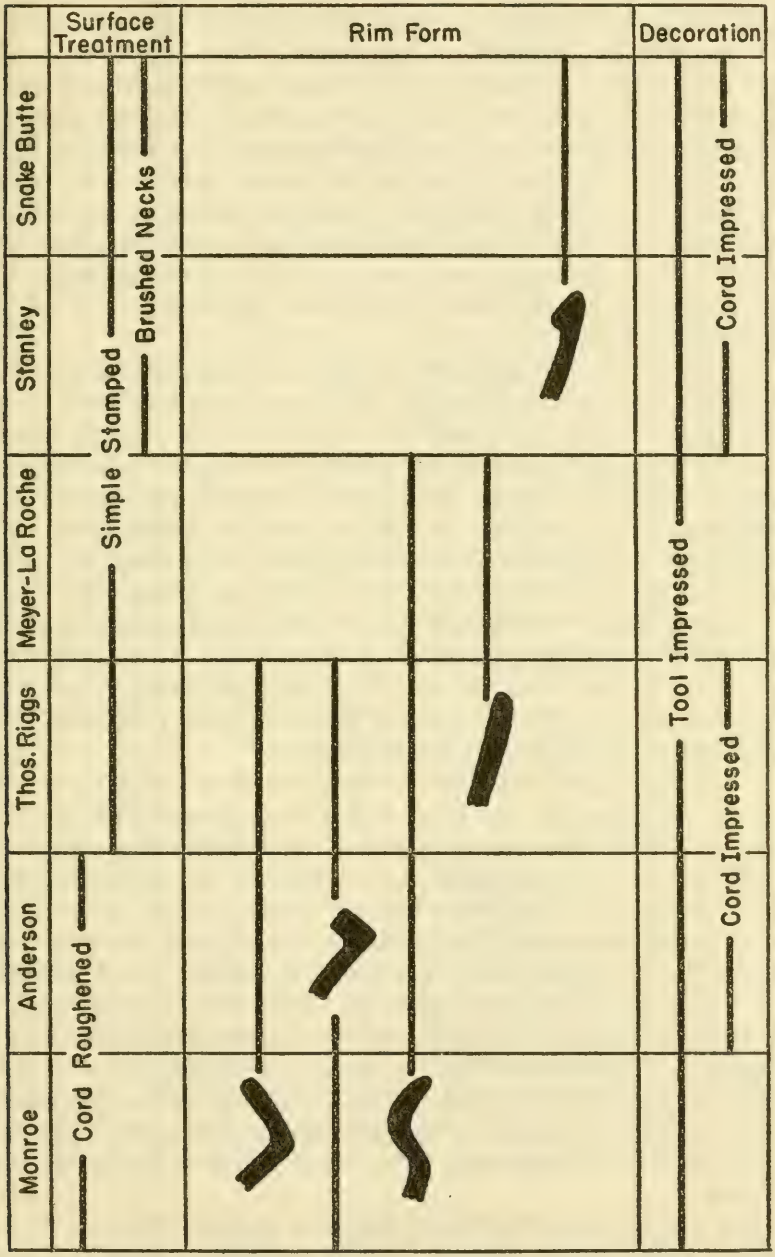

FIGURE 53.—Pottery changes throughout the Fort Pierre Branch.

absence of certain traits must be made with extreme caution. In addition, several artifact types at the Dodd site (footnote 7, p. 80) could not be assigned to any component. These types were represented by so few specimens which were so widely scattered through the site that they showed a negative association with all three components. Because of this, the following discussion has been limited to types which occurred in single component sites or which showed a positive association with one or more of the components at the Dodd site. In spite of these deficiencies in the data, the nonpottery artifacts from the Oahe area provide an extremely significant body of information on the culture complexes themselves and on their interrelationships.

Arrow points associated with the Anderson and Monroe Foci at the Dodd site include both stemmed and unstemmed forms with convex sides (Dodd Groups 3, 4, and 5). The three arrow points from the Thomas Riggs site seem to fall within the range of Dodd Group 5, and all three of the early Dodd site groups are represented in the combined collections from the Meyer and La Roche sites. These point types are replaced in the Stanley and Snake Butte contexts by Dodd Groups 1 and 2, straight-sided triangular points with or without side notches. The Stanley and Snake Butte complexes are also distinguished by the appearance of metal arrow points. Two bone points are known from the area, one from the Phillips Ranch site, the other from La Roche. Both of them are made from bone slivers, have long blades, and short tenonlike stems.

The typical knife of the Monroe and Anderson complexes is a long, narrow, asymmetrical leaf blade with all-over pressure flaking (Dodd Group 1). This form also occurred at the Thomas Riggs site and in the Meyer-La Roche complex. It is not part of the Stanley and Snake Butte complexes. Two other types of knives appear at the Thomas Riggs site—geometrical chalcedony plates chipped along one edge (Dodd Group 5) and a rough percussion-flaked triangle (Dodd Group 4). These types are also found at the Meyer and La Roche sites, and are the only stone knives associated with the Stanley and Snake Butte complexes. These latter foci are also characterized by metal knives. Both complexes have flat iron or brass blades of native manufacture, blades which were hafted in the slit edge of a bison rib. The Snake Butte complex also includes a few clasp knives of European manufacture.

End scrapers show definite typological changes from early to late times. Those associated with the Monroe and Anderson components at the Dodd site are comparatively small, well-made pieces which are pressure flaked except for the blow which detached the stone from the parent nodule (Dodd Groups 1, 2, and 4). These forms are also

present in the Thomas Riggs, Meyer, and La Roche collections, but they do not occur in the Stanley and Snake Butte complexes. A new type of end scraper appears at the Thomas Riggs site, and lasts on in the area through the end of Snake Butte times. It is comparatively large, and is percussion flaked except for the working edge (Dodd Groups 3 and 5). In this connection, it is interesting to note that the bison ribs with socketed ends which have been classified as scraper hafts only show a positive association with the early components at the Dodd site, and therefore were presumably used with the small, pressure-flaked scrapers.

The raw material used in making stone artifacts provides another contrast between the Monroe and Anderson Foci and the succeeding horizons in the Oahe area. Table 6 (p. 103) shows that over 70 percent of the chipped-stone artifacts from the Anderson and Monroe components at the Dodd site were made from the dark caramel-colored cherty chalcedony known locally as Knife River Flint. A few pieces in the Thomas Riggs, Meyer, and La Roche collections and a small percentage of the Stanley and Snake Butte artifacts were also made of this material. However, the majority of the chipped stone artifacts from the post-Anderson components are made of other varieties of chalcedony, chert, and jasper, rather than the Knife River Flint. The plate chalcedony from which the knives assigned to Dodd Group 5 were made is a raw material which seems to have been unused in the Oahe area during Monroe and Anderson times, but which was utilized during all of the later horizons. Catlinite seems to appear first during Meyer-La Roche times, and its use continues through the Snake Butte Focus.

Artifacts of pecked and ground stone are in the minority in all of the collections from the Oahe area. However, a few types seem to be fairly good horizon markers. The arrow-shaft smoothers associated with the Monroe and Anderson Foci at the Dodd site were long, narrow pieces which were probably used in pairs (Dodd Group 3). No arrow-shaft smoothers were found at the Thomas Riggs site, but one long, narrow one occurred at the La Roche site. This seems to indicate that this type of shaft smoother lasted into Meyer-La Roche times. The Stanley and Snake Butte arrow-shaft smoothers are small, short, partly shaped pieces of sandstone with one grooved surface (Dodd Group 1) and this type was also used during Meyer-La Roche times.

Celts with pecked bodies and polished bits showed a positive association with the Anderson Focus at the Dodd site, and a single specimen of this sort was found at the Thomas Riggs site. These seem to be the only occurrences of this type of artifact in the series of components under discussion.

Grooved mauls present something of a problem. So few were found at the Dodd site that it was impossible to demonstrate an association between them and any one of the three components there. It seems likely that they formed part of the Monroe and Anderson complexes since they do occur at sites such as Swanson (Hurt, 1951 b) which appear to represent the same broad cultural tradition. Mauls were found at the Thomas Riggs site, a single fragment was found on the surface at the La Roche site, and 15 were found at the Phillips Ranch site. This artifact type may have been present in the Oahe area during Monroe and Anderson times, it was found at the Thomas Riggs site, and it seems likely that it continued to be used throughout the subsequent periods.

No pipes were associated with the Monroe or Anderson components at the Dodd site. A few clay pipe fragments were found at the Thomas Riggs site (Meleen, 1949 b, fig. 78 p, p. 316). The earliest fragments of catlinite pipes known from the area were found at the Meyer site. Both of them appear to have come from elbow pipes. A single fragment from the Dodd site also appears to represent this style of pipe, and it is almost certainly associated with the Stanley Focus component there. Several catlinite pipes and pipe fragments were found at the Phillips Ranch site. They appear to represent two varieties of elbow pipe, one with a high bowl and a short stem, the other with a long stem surmounted by a decorated ridge.

Bone artifacts also show a number of style changes throughout the Oahe sequence. Scapula hoes associated with the Monroe and Anderson components at the Dodd site and those from the Thomas Riggs, Meyer, and La Roche sites were all made by removing the scapular spine and the ridge on the posterior border. The glenoid fossa was unmodified. The scapula hoes associated with the Stanley component, and over 90 percent of those from the Phillips Ranch site, had been chopped through at the neck of the bone so as to remove the glenoid fossa.

Only three of the horn scoops found at the Dodd site occurred in assigned findspots—two in Stanley Focus loci, one on the floor of a Monroe Focus house. In 1952, Hurt (personal communication) found artifacts of this type at the Thomas Riggs site, and they were fairly common at Phillips Ranch. Although it cannot be definitely established, it seems highly probable that this type of artifact was in use in the Oahe area from Monroe times on.

The socketed bone picks from the Dodd site only showed a positive association with the Anderson component there. Similar tools were found at the Thomas Riggs site, and these seem to be their only known occurrences in the area. It seems likely that these objects were used as points for digging sticks.

There appear to have been changes in the types of bone awls which were common during the various periods represented by the Oahe collections, but the situation is somewhat confused by the scattered occurrences of artifacts of this type. For example, so few awls were found in the Stanley Focus contexts at the Dodd site that none of the types defined showed a positive association with the Stanley component. Two varieties of "splinter type" awls were recognized there on a typological basis, the wide flat pieces assigned to Dodd Group 1; and those with round or triangular cross sections which belong to Dodd Group 2. Awls of the first group show a positive association with both the Anderson and Monroe components at the Dodd site; those of the latter type show a negative association with all three components. No awls of the flat type were found at the Phillips Ranch site. This seems to indicate that they are characteristic of the earlier horizons in the area, and were replaced by awls with circular or triangular cross sections in later times. Awls made of deer, antelope, or bird bone, with the articular end of the bone serving as the butt end of the tool seem to be present throughout the entire sequence of cultural complexes defined in the Oahe area. The same seems to be true of awls made by sharpening the end of a large, irregular bone fragment (Dodd Group 6).

The flat pieces of bison rib with rounded and polished ends which have been classified as quill flatteners were very common in the Monroe and Anderson contexts at the Dodd site. Occasional examples of this type of artifact are present in the collections from the later contexts, but their relative infrequency indicates a marked decrease in the importance of the quill flattener in post-Anderson horizons. The fact that the single example from the Phillips Ranch site was decorated on one side may indicate that it, and some of the other pieces, were gaming sticks rather than tools.

Fleshers were absent from the Monroe Focus contexts at the Dodd site. Those associated with the Anderson Focus were made by splitting a bison metapodial longitudinally through the head and shaft (Dodd Group 2). The one flesher found at the Thomas Riggs site was similar in appearance, although it was made by splitting a segment from the inferior end of a bison scapula. No fleshers were found at the Meyer or La Roche sites. Those associated with the Stanley component at the Dodd site and those from the Phillips Ranch site were made by cutting diagonally through the shaft of a bison metatarsal, and sharpening the cut edge to a chisellike blade which was often toothed. The head of the bone was left intact, and in at least some instances the tarsal bones were left articulated to serve as a handle. These are the pieces assigned to Dodd Group 1.

The flat bone plates with hooked ends, reminiscent of the modern

steel banana knife, which have been called scapula knives, apparently only occur in the Dodd site collections. They show a positive association with only the Monroe component there. (Fig. 54.)

Perforated bison ribs, generally called arrow-shaft wrenches, seem to be absent from the earlier horizons in the Oahe area. They make their first appearance during the period represented by the Thomas Riggs site, and also appear in the Stanley and Snake Butte complexes.

Flat pieces of bison scapula which appear to have been used as scrapers were positively associated with the Monroe component at the Dodd site. They probably also were used during the Anderson and Stanley occupations, although this cannot be demonstrated at this time. They were also found at the Thomas Riggs, Meyer, La Roche, and Phillips Ranch sites.

One native artifact type which so far seems to be confined to the Snake Butte Focus is the L-shaped scraper haft made of elk antler.

Objects of metal and glass, obtained by direct or indirect contact with the Whites, are only found associated with sites representing the Stanley and Snake Butte Foci. Two types of glass beads were found at the Dodd site. Two of the beads were made of blue glass and were decahedral rather than spherical. In discussing these beads, Black said:

> This is an old type of Venetian trade bead. The facets were formed while the glass was hot and still plastic in distinction to the later types on which the facets were cut. I am sure this bead could go well back into the 17th century.[9]

The other Dodd site beads were more or less ovoid, and made of opaque milky glass. Two similar beads were found at the Phillips Ranch site. In discussing them, Black said:

> Venetian glass beads. This type is found in early contact sites (1690–1750) with which I am familiar.[10]

A number of artifacts of brass, iron, and copper were found at the Dodd site. With the possible exception of a brass bracelet, all of them were of native manufacture, having been made from sheet metal. The metal artifacts from the Phillips Ranch site also included a number of similar pieces of native manufacture. In addition, the Phillips Ranch collections included three clasp knife blades which were obviously factory-made, and three gun parts. Black described the knife blades as: "Probably of French manufacture, a popular item of trade between 1650 and 1750." The gun parts from the Phillips Ranch site consisted of a trigger, an unidentified fragment, and part of a brass side plate. The side plate is particularly interesting.

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[9] Glenn A. Black, identification sheet for trade materials from the Dodd site (39ST30) on file at the MBP headquarters, Lincoln, Nebr.

[10] Glenn A. Black, identification sheet for trade materials from the Phillips Ranch site (39ST14) on file at the MBP headquarters, Lincoln, Nebr.

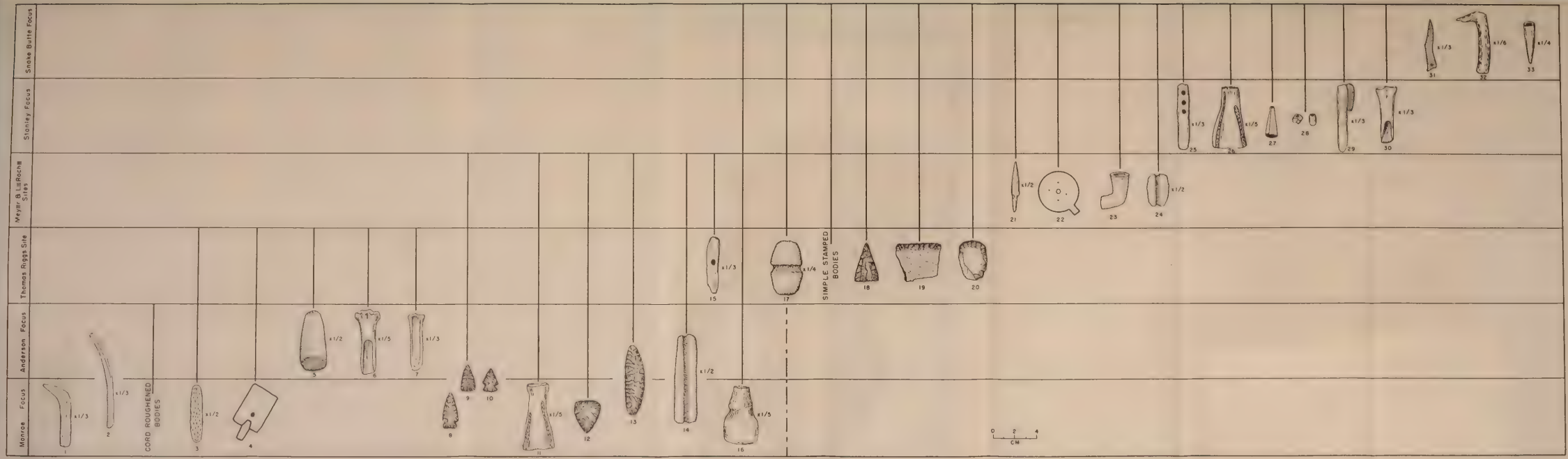

FIGURE 54.—Artifact changes in the Fort Pierre Branch. (Note: Fractions indicate reduction below plate scale.)

Key

1. Scapula knife
2. Bison rib scraper handle
3. Quill flattener
4. Long-rectangular house
5. Celt
6. Pick
7. Flesher, Dodd Group 2
8. Arrow point, Dodd Group 4
9. Arrow point, Dodd Group 5
10. Arrow point, Dodd Group 3
11. Scapula hoe, Dodd Group 1
12. End scraper, Dodd Group 1
13. Knife, Dodd Group 1
14. Arrow-shaft smoother, Dodd Group 3
15. Arrow-shaft wrench (Hori, 19[illegible])
16. Bison rib [illegible]
17. Knife, Dodd Group 4
18. Knife, Dodd Group 5
19. End scraper, Dodd Group 3
20. Trimmed bone arrow point
21. Circular house
22. Cathinte elbow pipe
23. Arrow-shaft smoother, Dodd Group 1
24. Arrow-shaft wrench
25. Scapula hoe, Dodd Group 2
26. Bison scapula
27. Cultivator(?)
28. Knife, metal blade in bone handle
29. Flesher, Dodd Group 1
31. Clasp knife, European manufacture
32. Elk antler scraper haft
33. Snow snake

Not shown: Arrow points, Dodd Groups 1 and 2, characteristic of the Stanley and Snake Butte Foci

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Clifford P. Wilson, curator of the Hudson's Bay Company Historical Exhibit in Winnipeg, identified it as being of a type affixed to the guns made by Thomas Barnett & Sons of London. Mr. Wilson suggested that the piece found at the Phillips Ranch site might well have been traded into the area by the North West Company prior to its amalgamation with the Hudson's Bay Company in 1821.

The artifacts associated with the several Oahe components provide a number of clues to the economic activities of the early populations. A number of the stone and bone tools were presumably used in the production of other items of the material culture. Stone-working tools include hammerstones and punches, and presumably some abrading stones for polishing the bits of the celts. The difference in raw materials for chipped-stone artifacts should again be mentioned. Chipped pieces associated with the Monroe and Anderson Foci are generally made of Knife River Flint, which appears to have been traded into the area. Chipped artifacts from the later components are usually made of stones which are locally available.

Knives, undoubtedly used for a variety of cutting operations, are present in all horizons, but there are some decided differences in form. Knives associated with the Anderson and Monroe Foci include a series of leaf-shaped types, probably a few stemmed pieces, and the bone knives with hooked ends associated with the Monroe Focus. During subsequent periods, triangular knives and knives made of plate chalcedony appear. The leaf-shaped forms seem to disappear during Stanley Focus times, and are replaced by metal blades hafted in the edges of buffalo ribs. Later in the protohistoric period, clasp knives of European manufacture were also introduced.

Wood-working tools probably include some end scrapers, knives, and the celts of the Anderson and Thomas Riggs complexes. There also seems to have been a special set of tools for manufacturing arrow shafts. Shaft smoothers in various forms are present from early to late times, but the perforated bison ribs which were presumably used as wrenches for bending arrow shafts do not seem to appear until the period represented by the Thomas Riggs site. It is interesting that the short arrow-shaft smoother of the later periods also seems to make its first appearance at this time.

Skin dressing seems to have been important during all periods. There were some decided changes in the form of the various tools used, but the tool categories themselves seem to be much the same for all periods. Quill flatteners appear to be the one exception. These objects were presumably used in preparing porcupine quills for decorating leather. They are very common in the Monroe and Anderson complexes, and become progressively scarcer during later periods.

Subsistence appears to have been based on both hunting and agriculture during all periods. The scapula hoes and bone and antler picks were probably used for general excavation such as digging house and cache pits and fortification ditches, but they were probably used primarily in gardening. On the basis of the vegetal remains found at the Dodd and Phillips Ranch sites (Appendix 1)the American triumvirate of corn, beans, and squash would appear to have been the primary crops, and to have been supplemented by some uncultivated plants such as wild plum and chokecherry.

TABLE 8.—*Distribution of animal bones at the Dodd and Phillips Ranch sites*

Identification	Focus			
	Monroe	Anderson	Stanley	Snake Butte
	Number	*Number*	*Number*	*Number*
Mean number of bones per cubic yard of house fill [1]	29.2	13.2	3.0	2.5
Total number of identifiable bones	1,218	943	290	861
	Percent	*Percent*	*Percent*	*Percent*
Percentage of immature individuals (bison only)	18.1	17.2	18.2	11.0
Percentage of total identifiable bones:				
Antelope		.1		
Beaver			.3	
Bird (all species)	.3	.4		2.1
Bison	90.1	91.3	79.0	68.9
Cottontail	.4	.1	3.1	
Deer	.6	.2	3.1	1.8
Deer or antelope	.1	.1	.3	.9
Dog or coyote	7.3	7.6	12.1	23.5
Elk				1.0
Gray fox		.1		.3
Horse				.8
Jackrabbit	1.1	.1	2.1	.5
Prairie dog				.1
Skunk	.1			.1

[1] The data in this row represent only material from the houses; data in other rows refer to ***identifiable*** bones from all sources assigned to foci.

The enormous numbers of animal bones found in all the sites in the Oahe area indicate that hunting played a large part in the total economy. However, there are a number of indications of changes in the hunting pattern from early to late times. During the excavation of the Dodd and Phillips Ranch sites, a count was made of all of the pieces of animal bone larger than "thumb size" found in the houses. When these counts were reduced to the mean number of bone fragments per cubic yard of house fill (table 8), it was apparent that over five times as much animal bone was found in Anderson and Monroe contexts as in the houses assigned to the Stanley and Snake Butte Foci.

The greater amounts of animal bone in the earlier contexts might be taken to mean either a change in butchering techniques, so that less bone was brought into the village in late times, or an actual decrease in the importance of hunting during the later periods. In a

preliminary report on the Dodd site collections (Lehmer, 1952 a) the latter interpretation was favored. However, the additional data from the Phillips Ranch site would seem to indicate that the differences between the early and late bone counts were largely a matter of changed butchering and/or hunting patterns.

On the basis of the data presented in table 1 of Appendix 4 (p. 166), the bison samples from Monroe and Anderson contexts contain a fairly equal representation of a number of different bones, and there is no marked disproportion between "usable" and "nonusable" bones. Also, most of the scapulae were unworked rather than made into hoes and other tools. In the Snake Butte sample, scapulae were much more common than any other bone, and the great majority (111 of a total of 130 scapulae) had been made into hoes. The material from the Stanley contexts at the Dodd site seems to show a trend toward this situation; however, it is not as marked, possibly owing to the relatively small sample obtained. The differences between the early and late samples would seem to indicate that a large proportion of the bison used during Anderson and Monroe times were at least partly butchered within the village and that the skeletons were disposed of there. In contrast, the Snake Butte, and possibly the Stanley sample, appears to indicate that most of the butchering was done away from the village, and that only bones such as the scapulae which could be fashioned into tools were brought home.

This would seem to remove much of the significance from the apparent increase in the proportion of deer and other animals in the late samples, since they were probably hunted close to the village and butchered within the village during all periods.

Unfortunately, comparative data are not available from the Thomas Riggs, Meyer, and La Roche sites, so it is impossible to say whether the change from close to distant hunting was a gradual or a sudden one.

The summary of the traits which characterize the various horizons of the Fort Pierre Branch brings out two significant points regarding the culture history of the area. One is the number of continuities from one focus to the next. If the inventories of the Monroe and Snake Butte Foci are compared, there is very little similarity between them. However, when the other complexes assigned to the sequence are interposed between them, they show a series of trait changes which provide a gradual transition from the Monroe Focus, the earliest known for the area, to the Snake Butte Focus, the latest known for the area. The trait carryovers from one focus to its successor provide convincing evidence that the entire series of foci may be regarded as a cultural continuum. The second point to emerge from the trait summary is the fact that there seem to be periods during

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which the local culture underwent comparatively rapid modifications. The several instances of the appearance of new groups of traits seem to indicate that the local cultural continuum was subjected to influences from other cultural complexes at different times during its existence, influences which resulted in periods of fairly rapid culture changes.

THE CHRONOLOGY OF THE FORT PIERRE FOCI

The superposition at the Dodd site of houses assigned to three different components provides the backbone for the relative chronology of the Fort Pierre Branch. At the Dodd site, the houses assigned to the Monroe Focus underlay houses assigned to the Anderson Focus and these, in turn, underlay houses assigned to the Stanley Focus. The Monroe and Anderson houses were long-rectangular structures, and the associated pottery had cord-roughened bodies. The Stanley Focus houses were circular and the associated pottery had simple-stamped bodies. By extension, it may be assumed that long-rectangular houses preceded circular houses in the Pierre area, and that cord-roughened pottery preceded simple-stamped pottery.

Another set of chronologically significant traits are those indicating contact with White culture; specifically, objects of metal and glass, and horse remains. The Stanley Focus component at the Dodd site yielded metal and glass, but no horse bones. Glass beads and metal artifacts, of European as well as of native manufacture, were present in considerable quantities at the Phillips Ranch site. A number of horse bones were also associated with the various features excavated there. The presence of horse bones at Phillips Ranch and their absence at the Dodd site seem to indicate that the horse reached the Oahe area some time after the first appearance of other items of White origin. Hence, those sites which contain both horse bones and contact materials were presumably later in the protohistoric period than those which contain metal and glass but no horse bones.

Using this series of traits as time markers, it is possible to make a tentative chronological arrangement of most of the excavated components in the Pierre area. The Anderson and Monroe Foci, characterized by long-rectangular houses and cord-roughened pottery, appear to be the earliest known cultural manifestations. The single house excavated at the Thomas Riggs site was very similar to the Anderson Focus houses at the Dodd site, but the associated pottery was plain or simple stamped (Meleen, 1949 b). The presence of a long-rectangular house indicates that the Thomas Riggs site is early, but the replacement of cord-roughened pottery by simple-stamped sherds seems to indicate that Thomas Riggs is later in time than the Anderson Focus.

There are enough similarities in the trait inventories of the La

Roche and Meyer sites to indicate that they were more or less contemporaneous. Both sites are characterized by the presence of circular houses and simple-stamped pottery, and by the absence of any contact material. The circular houses presumably indicate that these sites are later than Thomas Riggs; the absence of contact material places them as earlier than the Stanley and Snake Butte Foci.

The Stanley Focus is apparently the first one in the area which may be regarded as protohistoric. The material from the upper levels at the Dodd site contained a number of glass beads and metal artifacts of native manufacture.

Contact material is also present in Snake Butte sites. The Snake Butte Focus appears to be later than Stanley because of the presence of horse bones and metal artifacts of European manufacture, traits which were both lacking in the Stanley component at the Dodd site. The fortification of the Snake Butte sites may be another indication that they are later than the Stanley sites, since the fortifications presumably reflect the increased pressure exerted on the sedentary villagers by the horse tribes of historic times.

The chronological sequence from Monroe through Anderson, Thomas Riggs, Meyer and La Roche, and Stanley to Snake Butte was set up as an extension of the superposition at the Dodd site. It is supported in every way by the trait complexes which are characteristic of the individual foci.

There is relatively little similarity between the earliest and latest components in the sequence, but the chronologically intermediate stages show a series of changes which provide a smooth transition from the initial to the final complex. When changes in the trait complexes are followed from the base line provided by the Monroe Focus, they show an orderly progression. Old traits are lost, modifications are made in existing traits, and new ones appear. However, there is no instance in which a series of traits drops from the cultural inventory and later reappears. Discrepancies of this sort would be almost inevitable if there had been any inversion in the original seriation of the individual components, and the lack of such discrepancies would seem to argue for the correctness of the original seriation.

The relative chronology of the Fort Pierre Foci can be established largely on the basis of internal evidence. However, it is necessary to draw upon other sources for anything approaching absolute dates for the various foci. There are two lines of approach to the problem of an absolute chronology in the area. One is by means of objects of White origin of known age; the other by dendrochronology.

Contact materials are found only in the two latest foci of the Fort Pierre Branch. Those from the Stanley contexts at the Dodd site included a few glass beads and a few metal objects of native manu-

facture. Contact materials from the Snake Butte contexts include glass beads, metal objects of both native and European manufacture, and horse bones.

Except for the glass beads, which Glenn A. Black (personal communication) described as " . . . an old type of Venetian trade bead . . . that could go well back into the 17th Century," none of the contact pieces from the Stanley Focus contexts are themselves of value as time markers. However, their presence, taken in conjunction with the history of the European penetration of the area, does give some fairly reliable indications of the dates for the Stanley Focus.

There are two main sources for early contact materials in the Middle Missouri region—British and French. Unfortunately, little is known regarding the British contacts, but it seems likely that a certain amount of trade material had found its way into the area by the early years of the eighteenth century, probably from posts established in Canada by the North West and Hudson's Bay Companies. The French reached the Oahe area by two routes, overland from the Great Lakes, and up the Mississippi and Missouri from the south. Little is known regarding the first French contacts with the area, but the Arikara are shown on the Delisle map of 1718, and explorers and adventurers like Bourgmont and the La Verendryes are known to have penetrated the Middle Missouri Valley during the first quarter of the eighteenth century.

On this basis, it would seem that any site on the Middle Missouri which contains contact material must date from after 1700, and that date may conveniently be taken as the round figure for the beginning of the Stanley Focus.

It is impossible to set any exact time for the transition from the Stanley to the Snake Butte Focus, but the character of the contact material from the Snake Butte sites would seem to indicate that they date from the latter half of the eighteenth century. The Lewis and Clark journals for the year 1804 indicate that most of the inhabitants of the region were concentrated in a few villages in North Dakota by the beginning of the nineteenth century, having settled there after the decimating smallpox plagues. This would seem to indicate that the Pierre area had been largely abandoned by the village tribes prior to 1800.

On this basis, we may then approximately place the duration of the Stanley Focus between 1700 and 1750, and the duration of the Snake Butte Focus between 1750 and 1800.

Dendrochronological studies have been undertaken in two parts of the Plains. Weakly's work in Nebraska has provided a series of dates

for the Central Plains complexes which seem to be fairly reliable (Weakly, 1950). His material, which is discussed in detail below, seems to indicate that the Upper Republican occupation of the Central Plains came to an end some time during the early part of the latter half of the sixteenth century. The transition from the Thomas Riggs complex to that represented at the Meyer and La Roche sites seems to have taken place under stimulation from an Upper Republican population resident in the area at such sites as Arzberger. There is a fair body of evidence that this intrusion of a Central Plains population into the area took place after the abandonment of the Nebraska sites. Thus, it seems likely that the beginning date for the Meyer-La Roche horizon can be set some time close to the beginning of the seventeenth century, and that the Meyer-La Roche complex lasted until about the close of that same century. There is no evidence available at this time for assigning dates to the Thomas Riggs horizon and the Anderson and Monroe Foci.

On the basis of a combination of the historical evidence with Weakly's tree-ring studies in the Central Plains, the last three stages of the Fort Pierre Branch may be tentatively dated as follows:

Snake Butte	1750–1800
Stanley	1700–1750
Meyer-La Roche	1600–1700
Thomas Riggs	? –1600
Anderson	?
Monroe	?

A word should be included here regarding a series of dates which were published by George F. Will in 1948. The ranges, based on a series of dendrochronological specimens, are as follows:

Thomas Riggs	1478–1515
Sommers	1480–1507
La Roche	1434–1457

It is my impression that the Thomas Riggs dates are somewhat too early. Certainly, the dating of the La Roche site as some 50 years earlier than two sites with long-rectangular houses presents a contradiction to all of the other chronological evidence for the area. Therefore, it seems very likely that these apparent contradictions are due to the method of dating.

In his "Tree Ring Studies in North Dakota" (1946), Will describes the construction of his master chart. It was primarily based on an oak stump which was found some 6 miles northwest of Bismarck. The record contained in the single stump was later supplemented by additional specimens, but all of them appear to have been collected in the general vicinity of Bismarck. Thus, the archeological specimens from

central South Dakota were dated against a master chart set up on North Dakota wood. In discussing the 1948 dates, Will says:

> It must be remembered that these South Dakota dates should be accepted with some caution in view of the condition of the specimens and the distance at which they grew from the Master Chart used [Will, 1948, p. 70].

This caution is emphasized when a comparison is made of the recent precipitation records for Bismarck and Pierre. When a comparison is made between the two stations of the years with precipitation above or below normal for the period 1906 to 1946 there is only a 59.6 percent correspondence. Hence it seems advisable to disregard the tree-ring dates for the Pierre components until considerable substantive work has been done.

THE VILLAGE CULTURES OF THE NORTHERN PLAINS

So far the Fort Pierre Branch has been treated as a discrete entity, and no attempt has been made to relate it to other archeological manifestations in the general area. However, the several periods during which there were marked changes in the Fort Pierre culture pattern, changes which appear to have been due to external causes, suggest that the origin and development of the Branch can only be understood as a part of the total history of the aboriginal cultures of the area.

Despite the general lack of detailed information on Plains archeology, it seems possible to recognize several different cultural traditions which appear to have flourished at different times and in different parts of the area. These traditions form the matrix within which there were various local developments, such as the Fort Pierre Branch, and it is these traditions which reflect the broad sweep of the culture history of the northern Plains.

At this stage in the study of Plains archeology it is possible to do little more than speculate on the origins of the earliest village complexes in the area. To date, the eastern Plains are almost completely lacking in adequately documented preceramic complexes comparable to the Southwestern Basket Maker-Cochise and the Eastern Archaic. West of the 100th meridian there are a few, such as those reported from Lindenmeier, Signal Butte, and Ash Hollow Cave. There are a few scattered finds which indicate the presence of such a horizon in the eastern part of the Central Plains, but they give little indication of the distinctive characteristics of the complexes themselves.

There are a number of archeological remains in the Central Plains which appear to represent variations of the Woodland Pattern of the Eastern United States. Champe (1946, pp. 58–87 and fig. 17) has summarized the various stratified sites in the area, and each Woodland

component is the earliest pottery-bearing level in its particular sequence. Thus it appears that the Woodland manifestations represent the earliest pottery-making complex in the Central Plains.

There are also good indications that comparable Woodland horizons exist in the Middle Missouri area. Hurt's work in 1951 at the Scalp Creek site, located on the Missouri some 15 miles west of the town of Lake Andes (Hurt, 1952), demonstrated the presence of material which shows a number of similarities to the Woodland horizon of the Central Plains. Other indications of the presence of an early Woodland horizon on the Middle Missouri include a ". . . buried site from which potsherds of Woodland types have been taken" near Chamberlain, S. Dak. (Wedel, 1949, p. 332), two Woodland sherds found at the Dodd site, and material from two sites in the Garrison Reservoir north of Bismarck (Wedel, 1948, pp. 23 and 24). Each of the Garrison sites appeared to be stratified, with simple-stamped pottery and small triangular arrow points in the upper levels, and thick, coarsely tempered, cord-roughened pottery and large, heavy, notched and stemmed points in the lower levels.

THE PLAINS VILLAGE PATTERN

During "post-Woodland" times the village cultures of the Great Plains developed according to a pattern which distinguishes them from any others in native America. It is impossible to say to what extent this pattern is rooted in the earlier Woodland complexes, since the formative stages have not yet been defined. Neither is it possible to be certain of the origin of many of the characteristic traits of the pattern. However, it is obvious that, whatever its ultimate origin, the development of the Plains Village Pattern was strongly influenced by its environment.

The Plains and the western Prairies offer an environment which inevitably lays its stamp on the culture of any group occupying the area. This is amply illustrated by the history of the White agricultural settlement, which only became possible through the development of the steel plough, the drilled well, the windmill, the barbed-wire fence, and similar innovations which were direct responses to the environmental situation. Similarly, the Plains Village Pattern represents a series of adaptations which appear as generalized traits which are present in each of the regional and temporal variants. The main diagnostic traits include:

(1) Subsistence based about equally on hunting and agriculture.
(2) Semipermanent villages.
(3) Villages located adjacent to the larger flood plains.
(4) Semisubterranean earth lodges with entryways.
(5) Undercut and straight-sided cache pits in and between the houses.

(6) Grit-tempered pottery with paddle-marked bodies and cord- or tool-impressed decoration.
(7) Small, light projectile points.
(8) Chipped end-scrapers.
(9) Scapula hoes.
(10) Bone hide-dressing tools.

These traits, many of them decidely generalized, appear as the warp of all the village cultures of the Plains. Specific modifications of these traits, occurring in combination with other and distinctive traits, have definitely limited distributions in time and space. It is these combinations which serve to distinguish at least three broad cultural traditions within the Plains Village Pattern.

One of these traditions is limited to the early villages of the Central Plains, a second and contemporary one to the Middle Missouri area, and a third succeeds the two earlier traditions in both regions during late prehistoric and historic times.

THE MIDDLE MISSOURI TRADITION

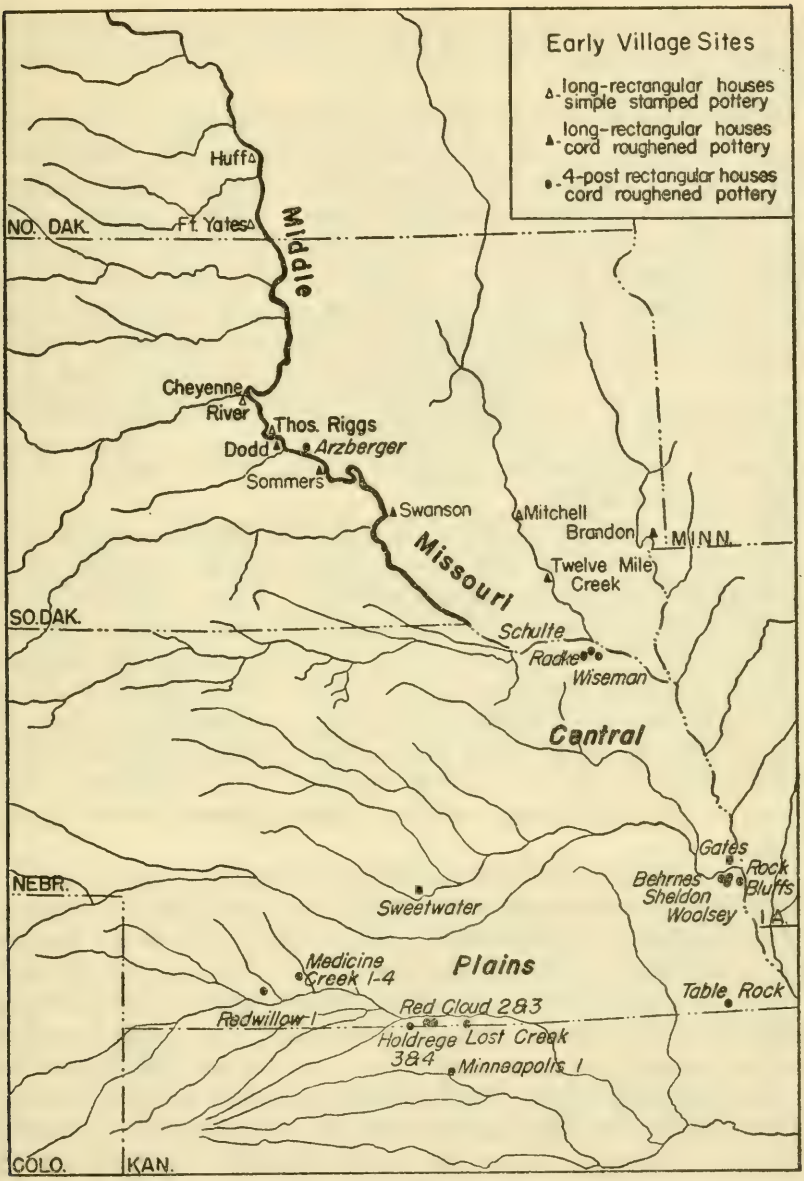
A series of excavated sites extending from just below Bismarck, N. Dak., to southeastern South Dakota share a sufficient number of traits to indicate that all of them represent variations of the same cultural tradition (map 5). The Middle Missouri sites include:

Huff (Will and Hecker, 1944).
Fort Yates (Hewes, 1949 a).
Cheyenne River—early component (Wedel, personal communication).
Thomas Riggs (Meleen, 1949; Hurt, 1953).
Dodd—Monroe and Anderson components.
Sommers (Meleen, 1949 a; Hurt, 1951 a).
Swanson (Hurt, 1951 b).
Mitchell (Meleen, 1938).
Twelve Mile Creek (Hurt, 1951 b, p. 71).
Brandon (Over and Meleen, 1941).

These various components undoubtedly represent a fair range of time. There are also enough differences between the individual trait inventories to demonstrate the presence of several foci within the group. However, in spite of undoubted cultural and chronological differences, all of these components are bound together by a series of shared traits. It is this group of common traits which sets these sites off from others in the Plains, and which indicates that all of them are products of the same cultural tradition.

Some of the characteristic traits are known from all the components assigned to this tradition. Others have been reported from only some of them. At this point, it is impossible to say how many of the apparent absences are due to actual nonoccurrences and how many are due to the limited amount of work at the particular site.

The houses are probably the most distinctive single trait. All of



MAP 5.—Excavated and reported sites of the early village traditions.

them are long-rectangular structures with entrances in one end. The long axis is usually oriented more or less north-south, the length is generally more than 1½ times the width, and the main firepit is offset toward the entrance. Despite variations in details of the entrance and of the arrangement of the superstructure posts, these structures stand together as a group which offers a decided contrast to the

nearly square structures of the Upper Republican and Nebraska complexes of the Central Plains and to the circular houses of the later sites in both areas.

Middle Missouri settlements are distinguished from their Central Plains contemporaries by two characteristics of the village plan. Excavations and surface conditions indicate that the houses in most of the northern towns were laid out in rows. Also, a number of the Missouri towns were protected by fortification ditches. There seem to be two types of fortification, one an encircling ditch with bastions such as the one at the Huff site; the other a straight-line ditch across the neck of a point of land on which the village was situated. Whether or not the two types of fortification date from the same period, their actual presence serves to distinguish the Middle Missouri towns from their unfortified Central Plains contemporaries.

There is no information available on the burial customs of the Middle Missouri people.

The pottery from the Middle Missouri sites includes a considerable number of types which are mainly distinguished by variations in the form and decoration of the vessel rim. These individual types will undoubtedly help to establish the finer divisions within the total complex. For example, Hurt (1951 b) has assigned the Swanson, Mitchell, Brandon, and Twelve Mile Creek sites to the Over Focus. One of the focus' most distinctive traits is the occurrence of considerable numbers of sherds which show a close similarity to the pottery characteristic of the Mill Creek complex of northwestern Iowa. Pottery in the Mill Creek tradition is rare or absent farther up the Missouri.

It is also possible to recognize one major temporo-regional division in Middle Missouri pottery—that between cord-roughened and simple-stamped bodies. The early sites in the southern part of the area are all characterized by cord-roughened pottery. However, on the basis of the sites excavated to date and the survey collections of the River Basin Surveys of the Smithsonian Institution, this body treatment does not appear to extend north of the mouth of the Cheyenne River in post-Woodland times. The northern sites and the late southern sites in the Middle Missouri tradition are characterized by pottery with simple-stamped bodies. It is not possible to make a definite statement as to the relative ages of the northern and southern sites along the Missouri, but it is my impression that Fort Yates may be approximately contemporary with the Anderson Focus. If this is the case, simple stamping would appear to be earliest in the north and to have spread down the Missouri. Its appearance at the Thomas Riggs site demonstrates that it reached the Oahe area well before the end of the Middle Missouri times.

The occurrence of simple-stamped pottery in the Middle Missouri sites presents a sharp contrast to the Central Plains where the early pottery is either plain or cord roughened and where simple stamping did not appear until a much later period.

Despite the temporal and regional variations, there are certain traits which are common to all Middle Missouri pottery. The paste is grit tempered. Rims are either flared or S-shaped. Decoration is by means of cord or tool impressions. The flared rims are generally similar to those found in the early village sites of the Central Plains. The S-rims tend to be readily distinguishable from the thickened "collars" of the early Central Plains types, and cord-impressed decoration is generally absent in the Central Plains.

Nonpottery artifacts whose occurrence seems to distinguish the Middle Missouri sites from contemporary sites in the Central Plains (figs. 55 and 56) include plate chalcedony knives; small, evenly flaked end scrapers similar to Dodd Groups 1 and 2; long narrow asymmetrical knives (Dodd Group 1); polished celts, which also occur in Nebraska Aspect but which are generally absent from Upper Republican sites; grooved mauls; broad splinter-type awls; quill flatteners; scapula knives with hooked ends; and split metapodial fleshers. These types occur in some or all of the Middle Missouri sites and appear to be rare in or absent from the Central Plains complex. Approximately the same number of artifact types are found in the Central Plains sites but are absent from the Middle Missouri villages.

THE CENTRAL PLAINS TRADITION

There has been considerably more archeological work done in the Central Plains than in the Middle Missouri area. Unfortunately, much of the work in the Central Plains is either unpublished or has been published in such a way that it is extremely difficult to use the reports for comparative purposes. Despite this situation, it is possible to form a fairly clear picture of the total culture of the early village horizons of the area.

The sites selected as representing the Central Plains tradition are those generally assigned to the Upper Republican and Nebraska aspects (map 5). They include:

Lost Creek (Strong, 1935).
Red Cloud 2 and 3, Holdrege 3 and 4, Medicine Creek 1–4, Redwillow 1, and Minneapolis 1 (Wedel, 1935).
Sweetwater (Strong, 1935; Champe, 1936).
Schulte, Radke, and Wisemen (Cooper, 1936).
Rock Bluffs, Gates (Strong, 1935).
Behrnes, Sheldon, Table Rock, and Woolsey (Gilmore, 1936).
Arzberger (Strong, 1940).

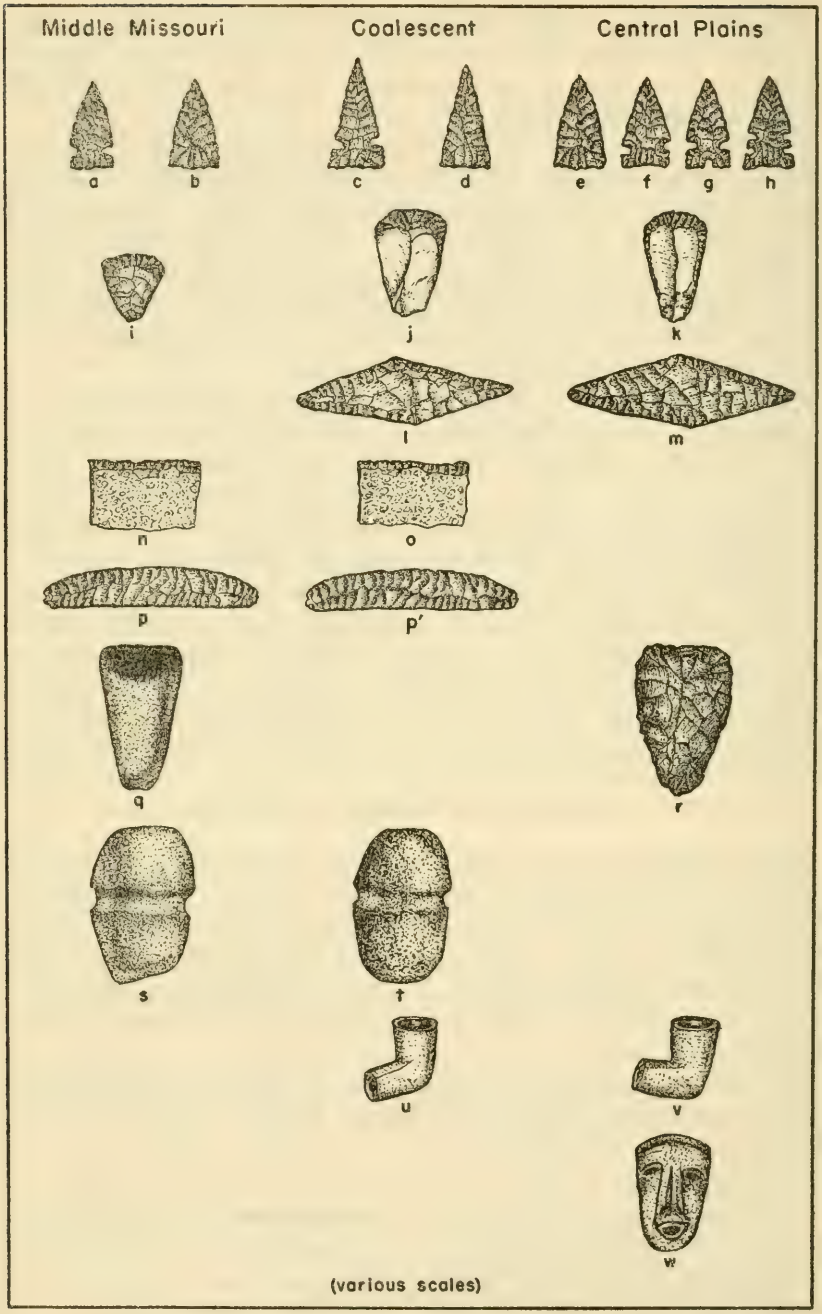


FIGURE 55.—Characteristic stone artifacts of the Plains village traditions. *a–h*, Arrow points; *i–k*, end scrapers; *l–, p, p′*, knives; *q, r*, celts; *s, t*, mauls; *u, v*, pipes; *w*, figurine.

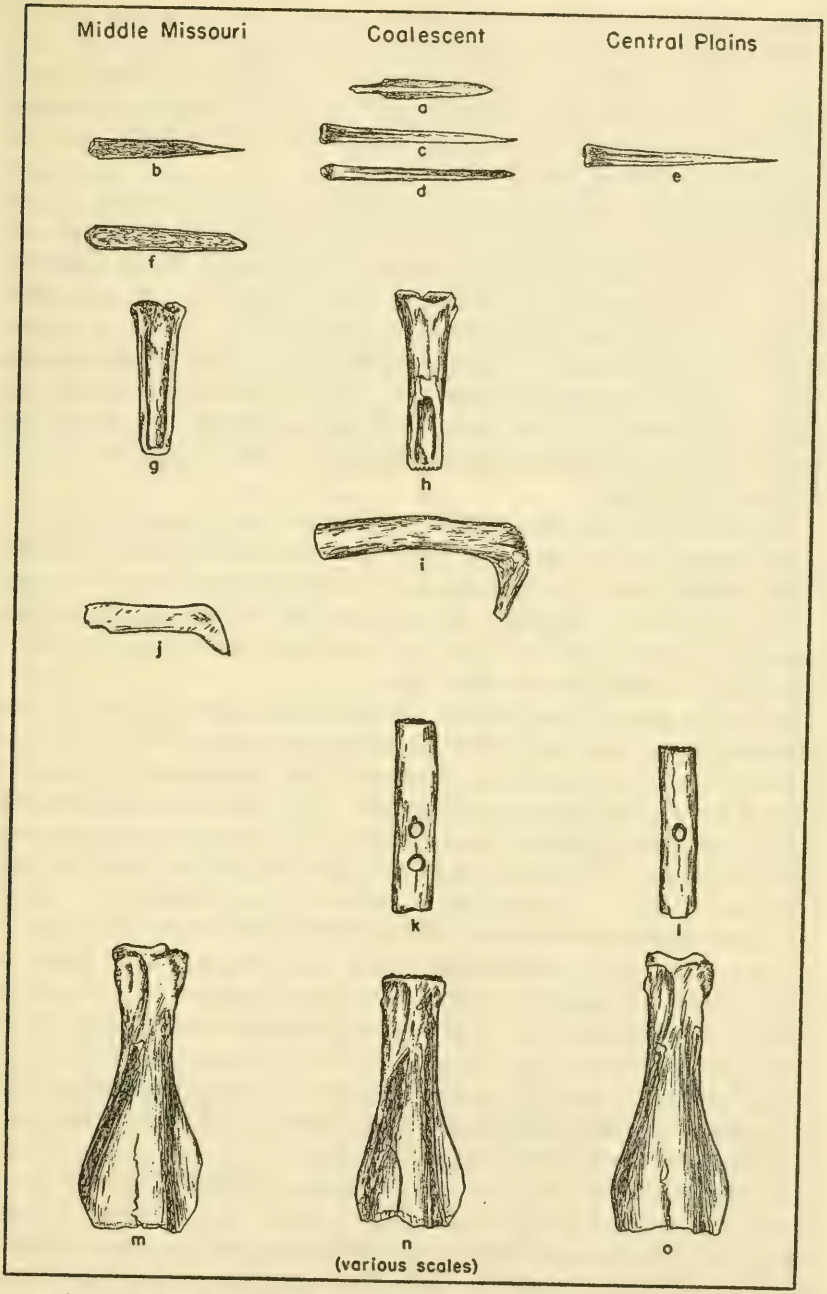


FIGURE 56.—Characteristic bone artifacts of the Plains village Traditions. *a*, Tenoned bone point; *b–e*, awls; *f*, quill flattener; *g*, *h*, fleshers; *i*, elk antler scraper haft; *j*, scapula knife; *k*, *l*, shaft wrenches; *m–o*, scapula hoes.

Like the sites of the Middle Missouri tradition, those listed for the Central Plains probably represent a fair range in time. They certainly show enough cultural variation to warrant the recognition of several foci and are generally grouped into two aspects. However, these sites also share a sufficient number of traits to indicate that they represent a single cultural tradition.

This tradition, characteristic of the early village horizon in the Central Plains, is distinguished by the following traits: Villages are small and unfortified, and the houses are arranged in no apparent order. The houses themselves are usually nearly square, have rounded corners, and four primary roof supports set in a square around a central firepit. There is considerable variation in the orientation of the long entrance passages, but the majority of them open either to the east or to the west. It is my impression that the pits of the Central Plains houses tend to be shallower than those of the Middle Missouri structures.

Most of the burial places of the villages in the Central Plains tradition appear to be ossuaries located on hilltops near the villages. These ossuaries are pits containing the disarticulated bones of a number of individuals, together with pottery and other artifacts which appear to have been included as mortuary offerings. Occasional individual inhumations are also found.

As in the case of the Middle Missouri sites, there appear to be a considerable number of pottery types associated with the various Central Plains components. However, the individual types also share a number of fundamental traits. The paste is grit tempered. Bodies are either plain or cord roughened; simple stamping is completely absent. The majority of the rims are either flared or have thickened collars. Decoration is generally tool impressed. Cord-impressed decoration is absent except in the Sweetwater complex.

Nonpottery traits which distinguish the Central Plains from the Middle Missouri complex include the general absence of those types listed as characteristic of the latter, and the presence of arrow points with base notches or multiple side notches; diamond-beveled knives; chipped celts in Upper Republican sites; equal-arm elbow pipes; bone awls generally made from deer cannon bones; single-hole arrow shaft wrenches of bone and antler; and figurines.

A comparison of the Central Plains and Middle Missouri traits shows a number of significant differences. The northern villages tend to be laid out according to a definite plan and are often fortified; the southern sites are small, unfortified, irregular clusters of houses. The northern houses are long-rectangular structures with entrances in one end and fire pits offset toward the entrance. The southern houses are nearly square, with four primary roof supports, long entrances

leading off to the side, and central firepits. The differences in shape, type of superstructure, and various other details all serve to set the two house types distinctly apart. Differences in the associated pottery include the occurrence of S-rims in the north in contrast to the collared rims in the south, the general absence of cord-impressed decoration from the southern complex, and the presence of simple stamping in the north and its absence in the south. The differences in village plan, house type, and pottery traits are further emphasized by differences in a variety of nonpottery artifacts.

It must be emphasized that some of the distributions of the nonpottery artifacts which distinguish the Middle Missouri from the Central Plains traditions are not entirely mutually exclusive. There are, for example, rare instances in which awls of the flat Middle Missouri type have been found in Upper Republican sites. However, they appear to be very unusual for the Upper Republican complex as a whole, whereas they are one of the commonest types in the Middle Missouri sites. Similarly, a few polished celts, chalcedony plate knives, small evenly flaked end scrapers, and split metapodial fleshers have been found in Central Plains sites. Such trait interchanges seem to have been the most common in what might be regarded as a pheripheral zone, the area between the Niobrara and White Rivers. For example, Hurt (1951 b) reports the occurrence of a single diamond-beveled knife at the Swanson site, a few miles north of the White, and Cooper (1936) illustrates a number of Middle Missouri type artifacts from the St. Helena sites in the extreme northeastern corner of Nebraska. In general, such atypical instances only serve to emphasize the generally bipolar distribution of the artifact types which distinguish the two traditions.

THE COALESCENT TRADITION

During late village times, it is possible to recognize at least three cultural complexes in the Central Plains. There are a number of sites which show close similarities to Oneota, sites which appear to derive from the Mississippian cultures to the east. The sites which have been assigned to the Dismal River Aspect represent a second complex which Champe (1949) has identified with the Lipanan Apache. The third late complex in the Central Plains is the Lower Loup Focus which is generally considered to be protohistoric Pawnee (cf. Strong, 1935; Wedel, 1940). Both the Oneota and Dismal River complexes appear to be at least in part of extra-areal origin, whereas the Lower Loup would seem to belong entirely to the Plains-Prairies.

In contrast to the situation during early village times, there is a considerable degree of uniformity between the late prehistoric and historic sites of the Middle Missouri area and the Lower Loup and

Pawnee sites in the Central Plains. Regional differences certainly existed, but they tend to be much more specific than those which distinguish the Central Plains and Middle Missouri traditions. The traits shared by the Lower Loup, Pawnee, and the late Middle Missouri sites seem to have been derived partly from the earlier complexes in the Central Plains and partly from the Middle Missouri tradition. Since these late sites appear to stand with one foot in each of the earlier complexes, they have been assigned to a Coalescent tradition. This tradition appears to have developed out of contacts which resulted from an actual movement of Central Plains people into the Middle Missouri area.

There is a fair amount of evidence that the majority of the Central Plains sites assigned to the Upper Republican Aspect were abandoned at about the same time. Part of this evidence is supplied by the physical conditions of the sites themselves, the rest by the culture history of the area.

Most of the writers who have summarized the cultural developments in the Central Plains (cf. Strong, 1935; Wedel, 1940) have suggested that the protohistoric Lower Loup Focus was a development out of the Upper Republican Aspect. The considerable number of similarities between the two complexes certainly supports this view. However, there are no sites known in the Central Plains which appear to be transitional between Upper Republican and Lower Loup. There is a possibility that such sites do exist there, but it seems more likely that their absence is an indication that the area was abandoned between Upper Republican and Lower Loup times, and that the transitional sites exist outside the Central Plains.

This postulated abandonment of the area is supported by the physical conditions in the early Central Plains village sites. Kivett (1950) and Wedel (1941) have pointed out that the great majority of the known Upper Republican sites are blanketed with layers of sterile loess which must have been deposited after the abandonment of the villages. This is in sharp contrast to the situation in other Central Plains sites.

> Along the Missouri River in eastern Nebraska the pit-houses of the Nebraska aspect, which is in part contemporaneous with the Upper Republican aspect, have little or no loess overburden and . . . village sites of the Pawnee on the Platte, Loup, and Republican rivers show little evidence of this loess blanket . . . [Kivett, 1950, p. 88].

The presence of the loess blanket over the earlier sites and its absence from the late sites in the same area is a good indication that the two occupations were separated by a period of intense drought. This supposition is borne out by the limited tree-ring evidence which is available. Ash Hollow Cave (Champe, 1946) is a stratified site

in western Nebraska. Lens B in the cave fill represented an Upper Republican occupation. Tree-ring material from Lens B indicates that the Upper Republican occupation dates from between A. D. 1450 and 1517 (Champe, 1946, p. 49). Thus it appears that the Upper Republican Aspect was in existence prior to and during the first half of the sixteenth century.

Weakly's studies of climatic cycles in the Central Plains have demonstrated the repeated occurrence of more or less severe droughts. The longest of these lasted from 1539 to 1564. In discussing its effects, Weakly says:

> It is entirely possible and probable that during some of the protracted drouths of the past, the country closely approached an absolute desert character. This must have been true of the drouth of 1539 to 1564 when the heavy filling of canyons by wind-blown soil apparently took place. In all probability, the native grass cover of the country was very largely destroyed and great dust storms were doubtless very common [Weakly, 1950, p. 93.]

The dating of at least one Upper Republican site during the early part of the sixteenth century, the evidence of a severe and protracted drought during the middle of that century, and the consistent blanketing of Upper Republican sites with sterile loess, all combine to suggest that the Upper Republican occupation of the Central Plains was terminated by the drought of 1539 to 1564.

In the event that drought conditions forced the abandonment of the western part of the Central Plains, the Missouri Valley would probably have been one refuge area. The Missouri derives a large part of its water from the northern Rockies, and hence is relatively unaffected by drought conditions in the Plains themselves. Evidence that at least some Upper Republican people did make their way into the Middle Missouri area is contained in Strong's (1940) description of the results of the work at the Arzberger site, some 7 miles downriver from Pierre, S. Dak.

> This . . . site . . . contained about 40 shallow house pits completely surrounded by a ditch with bastions jutting out every 50 yards or so. Excavations within the ditch and around the bastions revealed post molds of an evenly spaced log stockade. Not a trace of European contact was discovered in the entire site. Four earth lodges were excavated, of which one was obscure as to type. The others had four-post central foundations, central fire pits, covered entryways to east or southeast, and large numbers of internal cache pits. External cache pits also occurred. However, although two of the houses were round, as in the late earth-lodge pattern, one was subrectangular and very similar in type to the prehistoric Upper Republican culture or aspect. . . .
>
> Arzberger site ceramics are likewise very similar to those from Upper Republican sites (notably the St. Helena focus, see Cooper, *in* Bell, 1936) to the south. This pottery has marked collars, often with scalloped bases, exhibits *both* cord-wrapped and grooved paddle surface treatment, and emphasizes incising and occasionally

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punctation. In addition, it has many traits such as collars, handles, and intricate shoulder incising that tend to connect it with the Lower Loup or protohistoric Pawnee aspect in Nebraska. In the combined incised and punctate shoulder decoration, it suggests influence from the otherwise alien Oneota aspect (Hill and Wedel, 1936). Finally, it has a resemblance to historic and protohistoric Arikara wares but has the fully developed collar instead of the thickened and everted Arikara rim and is more elaborately incised. I would suggest that the Arzberger site represents a late prehistoric horizon, basically Upper Republican, but in process of development into the more specialized and later protohistoric Pawnee (to the south) and Arikara (in the north). Strange to say, the trait resemblances to the protohistoric Pawnee (Lower Loup, see Dunlevy, *in* Bell, 1936, and Wedel, 1936) seem much closer than they are to the adjacent protohistoric Arikara . . . Other material remains from the Arzberger site tend to confirm its late prehistoric and transitional position, for it has catlinite pipes, grooved stone mauls, large rough scrapers, and a great predominance of delicate, unnotched triangular points, all of which are usually protohistoric in Nebraska. In addition, it has practically all the chipped and ground stone, as well as bone, artifact types characteristic of the Upper Republican aspect. As already indicated, the house types likewise suggest transition, and the occurrence of elaborate fortifications is unique for an Upper Republican site. [Strong, 1940, pp. 382–383.]

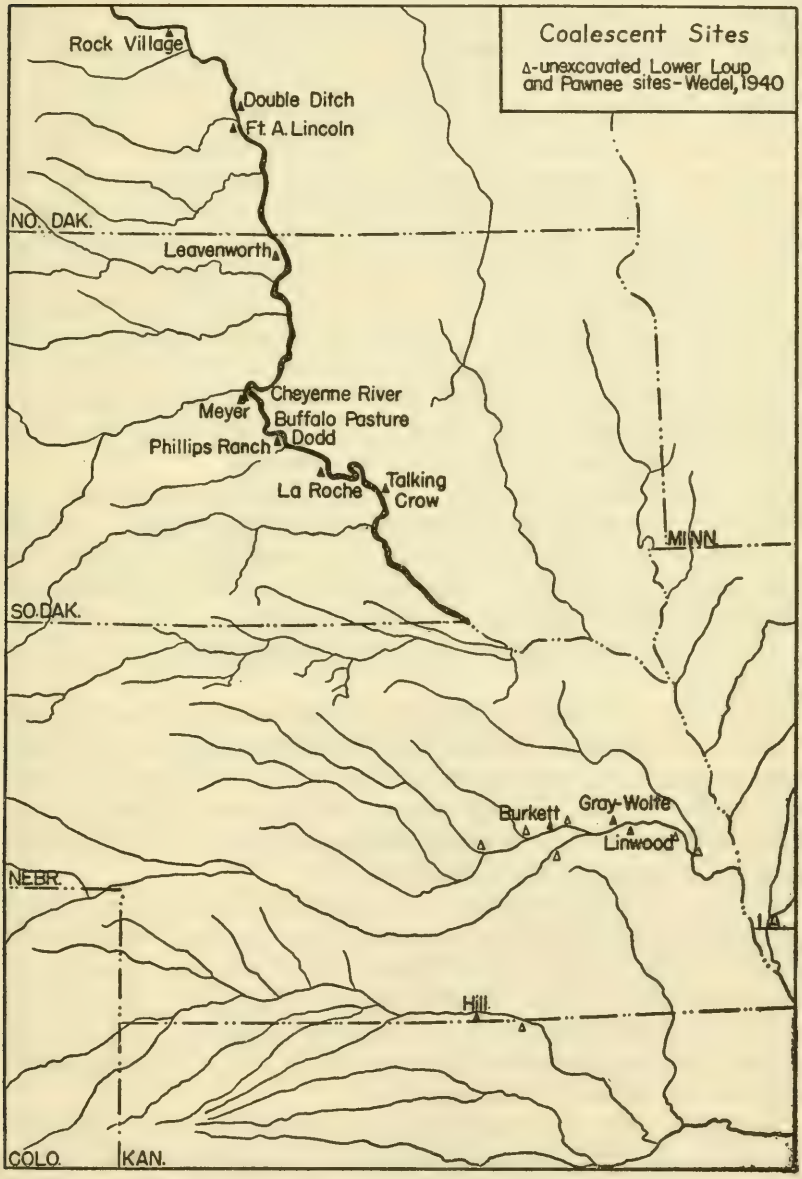
Strong's description gives every indication that the complex represented at the Arzberger site is basically in the Central Plains tradition, and there is every reason to assume that Arzberger represents one settlement of Upper Republican migrants from the drought-stricken Central Plains of the mid-16th century. It is also apparent that the Arzberger complex contains elements which are foreign to the Central Plains tradition. Most of those elements are ones which are characteristic of the Middle Missouri sites, and were presumably acquired through contact with the local population. This combination of Central Plains and Middle Missouri traits foreshadows the complex which was typical of the late villages of both the Middle Missouri and Central Plains areas.

The late village sites are characterized by some traits which appear to be new in the Plains and by a majority derived from either the Middle Missouri or the Central Plains tradition. Sites representative of this Coalescent tradition (map 6) include:

Rock Village (Burcaw, Hartle, personal communication).
Double Ditch (Will and Spinden, 1906).
Fort Abraham Lincoln, Leavenworth (Strong, 1940).
Cheyenne River (late component) (Wedel, personal communication).
Meyer (Hoard, 1949).
Buffalo Pasture (Strong, 1940; Howson, 1941).
Dodd (Stanley component), Phillips Ranch.
La Roche (Meleen, 1948).
Talking Crow (Smith, 1951).
Scalp Creek (late component) (Hurt, 1952).
Burkett, Gray-Wolf (Dunlevy, 1936).
Linwood, Hill (Wedel, 1936).

The additional sites shown on map 6 are ones which Wedel (1940, fig. 20) indicates as "Lower Loup" or "historic Pawnee."

These various components appear to date from the early part of the seventeenth century through the first half of the nineteenth century. The artifact material and the details of the sites themselves indicate



Map 6.—Excavated and reported Coalescent sites.

a series of differences at the focal level, and the historic ethnography demonstrates the presence of a variety of tribal and linguistic groups. However, the sites which represent the Coalescent tradition also share a series of fundamental traits which distinguish them as a group from the Middle Missouri and Central Plains sites.

All of the houses, including the "ceremonial lodges," are roughly circular with central firepits and entrance passages. There is a considerable variation in the orientation of the entrance, but this appears to be mainly a matter of the location of the house with regard to its neighbors. The great majority of the houses have four primary roof supports set in a square around the firepit, although the historic Pawnee appear to have added a third pair of primary supports. The uniformity of the houses is one of the most striking features of the late sites in the Plains. The superstructures of the late houses must have been nearly identical with those of the Upper Republican and Nebraska houses, while they show no similarity to the long-rectangular Middle Missouri structures. Therefore it seems likely that the four-post circular house of the Coalescent tradition is a direct outgrowth of the four-post rectangular house of the Central Plains tradition. The presence of both types of house at the Arzberger site and at Sweetwater would certainly seem to confirm this supposition.

The long-rectangular Middle Missouri house seems to have been completely replaced by the circular house during late times. A change in house type is a fairly fundamental one in any culture pattern, and it seems likely that this one came about because the round structures with their central firepits could be heated much more effectively than the long-rectangular structures with the firepit offset toward one end of the floor.

The Coalescent villages appear to represent a blend of the two earlier patterns. Houses seem to have been irregularly placed in the Central Plains fashion, but the majority of the late sites were fortified, as were many of the Middle Missouri towns. Fortifications consisted of encircling ditches which were supplemented with palisades in the north and sod embankments in the Central Plains.

There is relatively little data on Coalescent burial customs, but the available indications point to the use of individual graves rather than ossuaries. This might be an indication that individual graves were also characteristic of the Middle Missouri tradition. However, the ossuary which Stirling (1924) located near Mobridge, S. Dak., may indicate that ossuaries were characteristic of the Middle Missouri as well as of the Central Plains tradition.

The pottery from the Coalescent sites exhibits a great variety and elaboration of rim form and decoration. It appears that cord-impressed decoration was only used in the north, while incising and other

techniques of tool impressing were common throughout the entire area. Cord-roughened bodies seem to have been supplanted by simple-stamped pieces which almost certainly represent a continuation of the simple stamping of the Middle Missouri sites. In this connection, it is interesting to note that the rim form and decoration of the late pottery of the "Mandan Area" in North Dakota shows a close similarity to several of the types characteristic of the Middle Missouri sites in the Dakotas. However, the late Mandan sites share enough other traits, such as the circular houses and a variety of nonpottery artifacts, with the late southern sites that it seems justifiable to include all of them as representatives of the same broad Coalescent tradition.

Some classes of Coalescent nonpottery artifacts derive from the Middle Missouri and some from the Central Plains traditions. Middle Missouri types which carry over into the Coalescent sites include chalcedony plate and the long, narrow, asymmetrical, leaf-shaped knives (mainly in the north), grooved mauls, and metapodial fleshers. The fleshers from the late sites were generally made by cutting diagonally through the shaft of the metatarsal and leaving the head of the bone intact. Cutting edges were often toothed, and the tarsal bones appear to have been left articulated in many instances. Central Plains artifact types which carry over into late times include diamond-beveled knives, coarse percussion flaked end scrapers, equal-arm elbow pipes, and arrow-shaft wrenches. The late shaft wrenches are generally made from bison ribs and have several holes, in contrast to the earlier single-hole form. The L-shaped scraper haft of elk antler, the tenoned or socketed bone points, and scapula hoes with the glenoid fossa removed are among the few late native artifacts which apparently cannot be traced back into one or the other antecedent complexes. Many of the Coalescent sites are also distinguished by the presence of metal and glass objects of ultimate European origin.

The distinction between the coeval Middle Missouri and Central Plains traditions is extremely significant. Prior to the recent large-scale excavations in the Dakotas, it has usually been conceded that Will and Hecker's "Mandan" sequence (Will and Hecker, 1944) was valid for North Dakota, but there has been a general tendency to evaluate all of the other early village remains in the Central and Northern Plains in terms of the Upper Republican materials. This tendency is exemplified in Wedel's paper on Missouri Basin archeology (Wedel, 1949, pp. 328–332) and was one of the guiding premises in the discussion of a cultural classification for the Dakotas at the Plains Archeological Conference in 1950.

The impression that Upper Republican was the basic Plains village complex is largely due to the historical accident that most of the early

work in Plains archeology was done in Nebraska. Once cultural divisions had been established there, there was a natural tendency to extend those divisions to other parts of the area. This raised such problems as the source of the new traits, such as fortifications, simple-stamped pottery, and grooved mauls, which distinguish the post-Republican complexes in the Central Plains, and it raised all of the other inconsistencies and contradictions which result from attempts to make facts fit preconceptions.

In a general way, the situation was similar to the one in the Southwest prior to the recognition of the differences between the Plateau cultures and those in the southern part of the area. The difficulties which came from trying to force the Dakota materials into the Central Plains framework were comparable to those which resulted from early attempts to fit Gila Basin materials into the framework of the Pecos Classification. Since the recent work in the Dakotas has established the existence of the Middle Missouri tradition as distinct from the Central Plains tradition, most of these difficulties disappear. It must be emphasized that the *degree* of difference between Middle Missouri and Central Plains is not as great as that between Anasazi and Hohokam, but the *significance* of the difference appears to be fully as great in terms of the total history of the development of the native cultures of the Plains.

Heretofore, much of Plains archeology has been interpreted in terms of a sequence from Woodland-like materials through Upper Republican and related complexes to the protohistoric assemblages such as Lower Loup. Now it appears that this sequence only holds for the Central Plains, that the post-Woodland stage in the Middle Missouri is clearly differentiated from the contemporary cultures in the Central Plains, and that the final complexes in both areas are a product of the coalescence of the two earlier village traditions.

THE FORT PIERRE BRANCH IN PLAINS PREHISTORY

The history of the Fort Pierre Branch is essentially a reflection of the broad outline of the history of all of the Plains village cultures. The branch shows a transition from the Middle Missouri tradition, represented by the Monroe, Anderson, and Thomas Riggs complexes, to the Coalescent tradition represented by the Meyer-La Roche, Stanley, and Snake Butte complexes.

From one point of view it might be argued that the Fort Pierre Branch should be separated into two categories, one to include the horizons in the Middle Missouri tradition, the other those in the Coalescent tradition. However, from the point of view of the local development itself, such a division would be completely unjustified. There is an obvious series of trait carryovers from the early to the

late traditions, and the actual differences between the Thomas Riggs and the Meyer-La Roche horizons are no greater than the differences between some of the other foci in the sequence. The one thing which distinguishes the transition from Thomas Riggs to Meyer-La Roche is the fact that it is the local expression of a change which can be seen throughout both the Central Plains and the Middle Missouri areas.

There are variations in the degree of difference between the individual units of the Fort Pierre Branch, variations which are mainly due to the amount of outside influence which can be detected in the change from one horizon to its successor. In this sense, there is less difference between the Monroe and Anderson Foci and the Stanley and Snake Butte Foci than between the other foci in the Fort Pierre sequence.

The transition from the Monroe to the Anderson Focus appears to have been largely a matter of a local modification and development of traits which were present in the area during Monroe Focus times. There is a change in house superstructure from a type with posts around all four walls to one in which the great majority of the posts are concentrated along the sides; cord-impressed decoration appears to replace tool-impressed decoration on pottery; and there are definite changes in the proportions of the Foreman and Anderson wares in the two horizons. All of these seem to be in the nature of the modification of existing traits. A few artifact types, such as the polished celts, bone picks, and fleshers, appear to have been added to the complex during Anderson times, but there is also a possibility that additional work will show that these types also form part of the Monroe inventory.

One difference which can be attributed to contact with an alien group is the appearance of fortification ditches during Anderson times. Unfortunately, the fortifications only show that the Anderson people were subjected to enemy pressure, without giving a clue to the identity of the enemy. There is a possibility that there was some borrowing from this anonymous enemy, but it is impossible to evaluate without additional information.

One fairly good indication of extra-areal contacts during Monroe and Anderson times is the extensive use of Knife River Flint during this period. This stone apparently does not occur in central South Dakota, and the material found at the Dodd site was presumably imported from North Dakota in blanks similar to those found in the pocket caches.

Both the Anderson and Monroe complexes show a number of similarities to the Swanson site and the others assigned to the Over Focus (Hurt, 1951 b). There is a near identity between Swanson and the early Dodd site components in houses, some pottery types, and in

some stone and bone artifacts, and there can be little doubt that the Over Focus also represents the Middle Missouri tradition. It is distinguished from the Oahe complexes by a number of traits, particularly in pottery, which seem to derive from the Mississippi area, and a few, such as the single diamond-beveled knife at Swanson, which appear to be intrusions from the Central Plains.

The differences between the Anderson Focus and the complex represented at the Thomas Riggs site are considerably greater than those between the Monroe and Anderson Foci. There are obvious carryovers from Anderson to Thomas Riggs in house type, some pottery traits, and a number of nonpottery artifacts. Differences appear to include the appearance at Thomas Riggs of triangular percussion-flaked and chalcedony plate knives, large percussion-flaked end scrapers, grooved mauls, and the disk-bowl pipe. The most striking change is the one from the cord-roughened pottery of the earlier horizons to the plain and simple-stamped pottery of the Thomas Riggs site.

Simple stamping seems to have made its earliest appearance in the Plains in the "Mandan Area" of the northern part of the Middle Missouri Valley. The technique is characteristic of the earliest known horizon there—the Archaic Mandan of Will and Hecker (1944)—and it seems probable that the trait spread down the river to be added to the Fort Pierre complex at the end of Anderson Focus times.

There is one item which may indicate contact between the Thomas Riggs people and groups to the east. A single clay disk-bowl pipe fragment was found at the Thomas Riggs site. It is similar in form to the stone pieces which appear to be typical of the Oneota assemblages (McKern, 1945), and may well represent a trait which was borrowed from Minnesota or Wisconsin.

The Meyer-La Roche complex is the earliest one in the Fort Pierre Branch which represents the Coalescent tradition. New traits include the circular houses which replace the old long-rectangular structures; equal-arm elbow pipes; and several pottery traits. Catlinite also appears for the first time. The remainder of the Meyer-La Roche traits appear to be carryovers from the Thomas Riggs and earlier complexes.

There can be little doubt that the majority of the new traits derive from the Central Plains tradition, and it seems reasonable to assume that they were borrowed from immigrant populations settled in the Missouri Valley at such sites as Arzberger. The four-post circular houses at the Meyer and La Roche sites show such close similarities in style and arrangement to the four-post Central Plains houses that they almost certainly represent a modification of the earlier form. It also seems highly probable that the Meyer-La Roche pipes and

the dominance of incised pottery decoration are traits derived from the Central Plains.

The catlinite was almost certainly obtained from the quarries in southwestern Minnesota, and there may have been other contacts with the east which are not so readily apparent.

There are carryovers of a number of Meyer-La Roche traits, such as the four-post circular houses, into the Stanley Focus, but there are also a number of differences between the two complexes. The straight-sided triangular arrow points and scapula hoes with the glenoid fossa removed are new artifacts, and there are a number of changes in the pottery complexes, particularly the appearance of brushed necks and braced rims. In connection with the latter trait, it should again be pointed out that a number of the direct rims of the Meyer-La Roche vessels were thickened to the point that they have much the same appearance as the later rims to which the bracing fillet was added. Ceremonial lodges may also make their first appearance in the area during the Stanley Focus, but the limited amount of excavation in Meyer-La Roche type sites leaves this point a questionable one.

In addition to the changes in traits of native origin, the Stanley Focus is the first one in the Fort Pierre Branch to show the effects of the White penetration of the area. These are relatively unimportant in comparison with those of a somewhat later time, but they are a definite forecast of what was to come. New traits of White origin include objects made of metal and glass, and the artifacts give a number of indications of the effect of the new materials on the native culture. The glass beads all appear to have been of European manufacture, but they undoubtedly provided the inspiration for the curious development of the manufacture of glass beads by the later Arikara. The metal objects from the Stanley contexts at the Dodd site were all of native manufacture, and they indicate the development of both uses for the new material and of the techniques for working it.

The differences between the Stanley and Snake Butte Foci are of somewhat the same order as those between the Monroe and Anderson Foci. The Snake Butte complex is distinguished by fortified villages, changes in the relative frequencies of pottery types, a marked increase in the number of cache pits, the appearance of the elk antler scraper hafts, and an increase in the number and variety of objects indicating White contact and the effects of White contact. Items in this latter category may be divided into two groups, one consisting of those which appear to derive from the French and British traders in the area, and the other of those which appear to relate to the introduction and spread of the horse in the Plains.

Objects of French and British origin include metal or glass pieces of either native or European manufacture. Indications of contact

with the developing horse cultures include the actual horse bones found at the Phillips Ranch site, and the fortification ditches which appear to be characteristic of all the late sites in the area. Since the French and British traders were canoe or foot travelers, it is unlikely that horses were obtained from them and it seems reasonable to assume that the Phillips Ranch horses represent an offshoot of the stock which the Spanish introduced into the Southwest during the latter part of the sixteenth century and which spread so rapidly throughout the Plains. The fortifications of the Snake Butte sites, like those of the late villages in other parts of the Middle Missouri and Central Plains, are almost certainly a reflection of the pressure exerted on the villagers by the newly developed pattern of horse nomadism.

In summary, the Fort Pierre Branch appears as a mirror for the broader aspects of the history of the village cultures in the Central and Northern Plains. Like other complexes in the general area, the Branch shows a transition from early foci in the Middle Missouri tradition to late foci in the Coalescent tradition. The changes in the complexes which characterize the various foci appear to be partly a matter of the modification of traits which were already present in the complex, and partly a matter of borrowing from outside sources. The most important foreign influences include those from the "Mandan Area" which become apparent at the Thomas Riggs site; those from the Central Plains which are first manifest at the Meyer and La Roche sites; and those from the White explorers and traders which distinguish the Stanley and Snake Butte Foci.

The cultural sequence which has been called the Fort Pierre Branch seems to have reached an end sometime prior to the beginning of the nineteenth century. Lewis and Clark report numerous abandoned villages in the Pierre area in 1804, but they do not mention any permanent sedentary occupation of the district The near identity between the pottery of the Stanley and Snake Butte Foci and that found by Strong at the Leavenworth site (Strong, 1940) leave little doubt that the Leavenworth site represents the same complex as the late Fort Pierre Foci. Since Leavenworth is a documented Arikara site, it would appear that the Stanley and Snake Butte Foci are also assignable to the Arikara, a group which had moved well north of the Pierre area by 1804. It remains to be seen how much farther back in time this tribal identification can be pushed.

Since the Arikara are the northernmost of the Caddoan-speaking peoples, there is a good possibility that they were comparative newcomers to South Dakota. The archeological data indicate two periods during which they might have arrived in the Oahe area. The decrease in the number of similarities between Leavenworth and the

pre-Stanley horizons of the Fort Pierre Branch may indicate that the Arikara arrived at the beginning of Stanley Focus times. On the other hand, Strong has pointed out the possibility that both Arikara and Pawnee developed out of Upper Republican (Strong, 1940, p. 382). If this is the case, the complex represented by the Arzberger site might well represent the first appearance of the "Arikara" in the Oahe area.

Regardless of the earliest period at which it is possible to classify an archeological complex as Arikara, one significant point must be borne in mind. If the Arikara are newcomers to the area, and if they are a population which replaced an earlier group, that replacement was a gradual one which was marked by an amalgamation of two culture patterns. There is no sharp break in the cultural continuum which has been called the Fort Pierre Branch, no break which would indicate the abrupt replacement of an earlier population by a new group of people. There are periods during which new traits were added to the total inventory, but at the same time there was a retention of traits which had been part of the earlier local pattern. Therefore, if one of these groups of new traits can be attributed to an intrusive population, that population must have intermingled with the earlier inhabitants of the area to the extent that the local culture became a mixture of old and intrusive traits.

In many ways, the history of the Fort Pierre Branch is an unsatisfactory one. The beginning is unknown, since the earliest focus appears a fully developed manifestation of the Middle Missouri tradition; there are a number of unsettled details regarding the development of the Branch and of the trait complexes of the individual foci; and the epilog remains to be defined in the historic Arikara sites in North Dakota. However, the information which is now available does serve to show the main trends of one areal development within the Middle Missouri Valley, and, taken in conjunction with other data from the area, has provided the basis for the recognition of the Middle Missouri tradition and of the part it played in the development of the subsequent Coalescent tradition of the Central and Northern Plains.

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APPENDIX 1

VEGETAL REMAINS [11]

A number of carbonized plant remains were found at the Dodd and Phillips Ranch sites. They were identified for the Smithsonian Institution by Norton H. Nickerson, of Washington University, St. Louis. Specimens from the Dodd site included:

Maize cobs and kernels (all from Stanley Focus loci).
Kidney beans (*Phaseolus vulgaris*).
Cucurbit seeds (sp. ?).
Wild plum (*Prunus americana*).

Phillips Ranch specimens included:

Maize cobs and kernels.
Kidney beans (*Phaseolus vulgaris*).
Cucurbit seeds (sp. ?).
Squash or gourd stem (sp. ?).
Wild plum (*Prunus americana*).
Chokecherry (*Prunus virginiana*).
Sunflower (*Helianthus* sp.).
Tomato (?) identified as "solanaceous seeds (?) Tomato, or wild yellow *Solanum torreyi* or some closely allied species such as *Physalis*."

In discussing the maize remains, Nickerson said: "The corns in these finds represent for the most part a fairly uniform type of starchy flint corn, with undented kernels borne on well-formed ears of low row number (8–10–12). It is definitely not a popcorn, and probably had a short growing season requirement. It is most closely allied to the flint corns of the northeastern United States."

APPENDIX 2

SPECIAL FAUNAL REMAINS FROM THE DODD SITE

SHELL

Species	Number	Artifact	Source
Anculosa praerosa (Say)	1	Bead	Tennessee River region.
Anodonta grandis plana (Lea)	16	Unworked	Local.
Busycon contrarium (Conrad)	1	Pendant	Gulf coast.
Busycon sp	5	Discoidal beads.	Do.
Dentalium sp	1	Pendant	Pacific coast.
Lasmigona complanata (Barnes)	5	Unworked	Local.
Lampsilis siliquoidea (Barnes)	5	do	Do.
Marginella sp	1	Pendant	Florida.
Oliva sayana Ravenel	1	do	Atlantic coast.

[11] See also Appendix 6, page 180.

BIRD BONE

Common name	Number	Specific name
Canada goose	1	*Branta canadensis.*
Small Canada goose	9	*Branta canadensis* subsp.
Great horned owl	9	*Bubo virginianus.*

FISH BONE

Catfish	7	Ameiuridae, probably *Ictalurus.*

APPENDIX 3

SPECIAL FAUNAL REMAINS FROM THE PHILLIPS RANCH SITE

SHELL

Species	Number	Artifact	Source
Anodonta grandis plana (Lea)	4	Unworked	Local
Fusconaia flava (Rafinesque)	2	do	Do.

BIRD BONE

Common name	Number	Specific name
Golden eagle	8	*Aquila chrysaetos.*
Grackle	1	*Quiscalus quiscula.*
Swainson's hawk	2	*Buteo swainsoni.*
Sharp-tailed grouse	1	*Pedioecetes phasianellus.*

FISH BONE

Catfish	5	Ameiuridae, probably *Ictalurus.*

APPENDIX 4

BUTCHERING TECHNIQUES AT THE DODD AND PHILLIPS RANCH SITES

(OBSERVATIONS ON THE BUTCHERING TECHNIQUE OF SOME ABORIGINAL PEOPLES NO. 2)

By Theodore E. White

In a brief report, which was read before the Eighth Plains Conference for Archeology by George Metcalf at Lincoln, Nebr., in November 1950, I attempted to reconstruct the procedure by which the carcass of an antelope was prepared for food (White, 1952). The inferences thus drawn were based on the ratio of the various elements to each other and to the greatest number of individuals represented, as well as the location of the breaks or cuts in the bones. Since the antelope is one of the smaller food animals and could be moved to a convenient butchering place, the question immediately posed itself: "How would size affect the butchering technique since a bison must necessarily be butchered where it is killed?"

BISON SKELETAL ELEMENTS

The bison bone which provided the basis for this study was collected during the excavation of the Dodd and Phillips Ranch sites near Pierre, S. Dak. The Dodd site was a multicomponent village, but there was evidence of only a single cultural complex at the Phillips Ranch site (Lehmer, 1952). Lehmer has assigned the earliest occupations at the Dodd site to the Monroe and Anderson Foci which are characterized by long-rectangular houses and cord-roughened pottery. Both of these complexes probably date from before A. D. 1500. The final occupation at the Dodd site has been assigned to the Stanley Focus, and the Phillips Ranch complex to the Snake Butte Focus. Both of these foci are characterized by round houses and pottery with simple-stamped bodies. The Stanley Focus may be roughly dated from 1700 to 1750 and the Snake Butte Focus from 1750 to 1800.

Judging by the tastes of Indians living in this area within historic times, they had two sources of bison meat—the hunt and the animals which were drowned by falling through the ice. That these peoples utilized both sources is purely conjecture because the preservation of the bone does not permit any such grouping. Also, we are handicapped in that a comparable study on a large bison kill or hunting camp of equivalent cultures has not been made.

The numerical count of the elements found in a site is subject to the accidents of preservation, the length of occupation, and the size

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of the excavation, but the ratio of the various elements to each other and to the greatest number of individuals represented, from an excavation which satisfies the archeological requirements, should provide an adequate sample for this type of study. Whenever possible both the worked and unworked bone have been considered. Throughout this study the number of individuals means the greatest number represented by any single element; i. e., in the Monroe Focus the greatest number shown is by the distal end of the right tibia, which is 59. Any calculations for that focus are based on that number. In calculating percentages, the worked bone is divided by two and the result is added to the largest number for that element.

TABLE 1.—*Frequency distribution of the various bison skeletal elements at the Dodd and Phillips Ranch sites*

Element	Distribution of skeleton elements of indicated number of individuals represented							
	Dodd site						Snake Butte Focus, Phillips Ranch site (68 individuals)	
	Monroe Focus (59 individuals)		Anderson Focus (36 individuals)		Stanley Focus (19 individuals)			
	Unworked	Worked	Unworked	Worked	Unworked	Worked	Unworked	Worked
Skull, occiput	6		2		4		2	
Skull, horn cores	7		1		2		8	5
Skull, maxilla	12		15		8		5	
Mandible	55		29		19		19	
Hyoid	8		9		3		7	2 ?
Vertebra, atlas	6		5		1		7	
Vertebra, axis	1		1				2	
Vertebra, cervical	5		4		1		4	
Vertebra, dorsal	3		2		1		2	
Vertebra, lumbar	4		3		1		1	
Vertebra, sacral			3				2	
Vertebra, caudal	2		1		1		1	
Scapula	46	4	29	4	5	10	12	56
Humerus, proximal	11	1	3	1	5	1	10	5
Humerus, distal	28		19		9		20	
Radius, proximal	37		22		3		15	
Radius, distal	23		11		6		11	
Ulna, proximal	36		19		4		9	
Metacarpal, proximal	17		11		3		12	
Pelvis	11		8		6		4	
Femur, head	10		9		3		5	1
Femur, proximal	1		5		2		3	
Femur, distal	4		6		1		5	1
Tibia, proximal	5		5		1		7	1
Tibia, distal	59		34		12		23	
Astragalus	31		36		9		10	
Metatarsal	16		7		3		10	3

An examination of table 1 reveals that the number of certain elements is consistently close to the maximum number of individuals represented (lower jaws, scapulae, and distal ends of the tibia), while others (proximal end of the tibia) are conspicuous by their scarcity. In some cases the small number of recovered elements (proximal end of the humerus) can be partially explained in that it was converted into a tool and worn out. In other cases (dorsal vertebra) we are

obliged to assume that they were left at the place of butchering and not brought into the village.

Skull.—In all foci a relatively small percentage of the individuals is represented by the occipital portion of the skull, and in the present state of our knowledge a cultural trend is not evident by a chronological distribution of the percentages found in the different foci (Monroe, 10; Anderson, 5.5; Stanley, 21; Snake Butte, 2.5). The same is true for the horn cores (12, 2.8, 10, 16.6). With the exception of the Snake Butte Focus, the greatest number of skulls is represented by the maxilla, which are badly broken, as though the muzzle had been chopped free from the rest of the skull. Possibly the nasal cartilages and upper lip were considered a delicacy as some of the northern Indians consider those of the moose. About the latter, according to Cahalane (1947, p. 52), "As a rich stew it is said to taste much like green turtle fat." The head as a whole is a heavy, unwieldy part of the animal, with a minimum of usable meat and, except for special purposes, would be unprofitable to transport any distance. The brain, if desired, could be easily removed at the kill.

Mandible.—In all except the Snake Butte Focus the number of lower jaws is close to the greatest number of individuals represented. Since none of the jaws appear to have been used for anything, presumably they were brought into the village with the tongue. Certainly the easiest way to remove the tongue would be to smash the ascending ramus of the jaw and remove jaws and tongue as a unit for further cutting at a more convenient time. A possible explanation of the small percentage (24) of lower jaws in the Snake Butte Focus may be that these people did most of their hunting considerable distances from the village and the tongue was eaten at the hunting camp (Wilson, 1924, p. 249).

Hyoid.—The hyoid would normally be removed with the tongue, but it is a small bone and might be overlooked or lost. Some may have been converted into small spatulas or quill flatteners but, after being worked, it is very difficult to be certain of the identification.

Vertebrae.—Very few individuals are represented by the vertebrae and the distribution of the various sections of the trunk in the foci does not present any noticeable pattern. The inference then is that the axial muscles were cut away and the vertebrae left at the kill. The vertebrae found may represent material brought in to feed the dogs from kills close to camp or animals retrieved from the river. Of interest here is the very small number of caudal vertebrae, indicating that the tail was not in general use as an ornament or left attached to the hide after skinning.

Forelimb.—Since bison do not possess a clavicle, the forelimb could be cut loose from the trunk and brought in as a unit for further

cutting at a more convenient time. That the sum of the worked and unworked scapula in all except the Snake Butte Focus is close to the number of individuals represented indicates that such was probably the case. (The unusually large number of worked scapulae in the Snake Butte Focus will be considered in a later paragraph.) The very small number of the proximal end of the humerus can be explained in that either it was converted into an abrader or was smashed beyond recognition in the preparation of bone grease. The number of the distal end of the humerus, proximal end of the radius, and the proximal end of the ulna agree fairly well with each other, but fall considerably below the number of individuals. A number of fragments of each of these elements were omitted from the count because they were so badly broken that it was impossible to tell the right from the left. Presumably, then, the missing elements were smashed beyond recognition in the preparation of bone grease. The number of the distal end of the radius and the proximal end of the metacarpal agree rather closely with each other but fall considerably below the number of individuals or the proximal end of the radius. Since the lower limb does not carry any usable meat it is conceivable that it was chopped off, either through the distal end of the radius or through the carpus, and left at the place of kill in order to reduce the load. As suggested by Lehmer, the proximal ends of the metacarpals may represent the animals retrieved from the river, since the distance is so short that the excess weight of this element would be negligible. There is a decrease in the ratio of the metacarpals to the number of individuals, from 30 percent in the Monroe and Anderson Foci to 15 percent in the Stanley and Snake Butte Foci.

Hind limb.—In order to remove the hind limb from the trunk it would be necessary to cut through bone. From the material available this seems to have been accomplished in one of two ways; to cut the ilium just back of the sacral attachment and split the pelvis at the symphysis, or cut through the neck of the femur, thus freeing the shaft from the pelvis. After the bone had been exposed a single blow with a stone ax would suffice for either method. At times both methods appear to have been used since the number of the severed heads of the femora agree very well with that of the pelves (5 to 30 percent of the individuals). The inference to be drawn is that the pelves and heads of femora represent the animals killed close to camp or retrieved from the river.

The small number of proximal and distal ends of the femur and the proximal end of the tibia, when compared with the distal end of the tibia, certainly suggests that most of these elements were smashed beyond recognition in the preparation of bone grease. That so many of the distal ends of the tibia are preserved suggests that it served as

a handhold for steadying the limb on the anvil stone while the remainder was being smashed with a hammerstone.

As with the metacarpals, the number of metatarsals is far below that of the individuals represented, 26 percent in the Monroe Focus, 20 percent in the Anderson Focus, and 16 percent in the Stanley and Snake Butte Foci. Some of the metatarsals were converted into hidescrapers but not enough were recovered to account for the discrepancy. Consequently, it seems highly probable that the metatarsals were left behind at the kill to lighten the load to be brought into the village. Perhaps, as Lehmer (1952) suggested, the metatarsals present represent the animals retrieved from the river, since the distance would not be great enough to make this element an excessive burden. Also the actual count of the metatarsals, both worked and unworked, agrees quite well with that of the metacarpals.

It appears that the ankle was a favorite point of cutting off the lower limb, since most of the astragali and calcanei are broken or defaced. Some, which were not counted, were damaged to the extent that they could not be assigned to either side.

BUTCHERING PROCEDURE

Although we cannot be certain of the chronological order of the various acts we can imagine that, with a large bison in which the skin was split down the middle of the back (Wilson, 1924, pp. 246, 252), the procedure was somewhat as follows: After the skin had been removed from the sides of the trunk and upper legs and lay flat on the ground on either side, the axial muscles were cut away and laid on the skin to keep them as clean as possible. If the head was wanted the neck was chopped through between the atlas and axis; otherwise, it might be severed anywhere. The tongue was removed by smashing the ascending ramus of the jaws and cutting both free of the skull. Next, the limbs were cut free from the trunk and the ribs of both sides were chopped through close to the backbone. The backbone was then lifted free from the trunk, and the kidneys and tenderloin removed. The backbone was then discarded. The viscera were then removed, saving possibly only the liver, heart, and some of the intestinal fat. The basket was then rolled on its side and the skinning of the legs and trunk finished for that side. This procedure was repeated for the other side. If the kill was some distance from the village, the lower legs were removed by chopping through the wrist and ankle. The brisket was then freed from the basket by cutting through the episternal ribs, and both were piled with the rest of the meat. The hide was then split down the middle of the belly. All of the meat was piled on one half of the hide and covered with the other half to await transportation to the village or hunting camp.

It is not the purpose to enter into a discussion of the number of individuals occupying a single house, but it is common knowledge that infant mortality among aboriginal peoples was very high. It is unusual for more than 4 or 5 out of 12 to 15 children to grow to maturity. Consequently the maximum number of occupants of one-family houses is small. For purposes of illustration, I have rather arbitrarily selected 4, 5, and 6 as the number of occupants for each house and 15, 20, and 25 years as a period of occupation as reasonably conservative numbers.

TABLE 2.—*A comparison of the four foci with different periods of occupation and number of occupants per house as to meat requirement and supply*

[Meat requirement, ½ pound per person per day; 1,000-pound bison produces 500 pounds usable meat]

	Focus			
	Monroe (Dodd site)	Anderson (Dodd site)	Stanley (Dodd site)	Snake Butte (Phillips Ranch site)
Bison—number	59	36	19	68
Houses excavated—number	4	7	9	10
6 people per house; 25-year period of occupation:				
People—number	24	42	54	60
Bison per village per year—number	2.36	1.44	0.74	2.72
Minimum meat requirement per village per year—pounds	4,380	7,665	9,855	10,950
Meat per year represented by the bone—pounds	1,180	720	370	1,360
5 people per house; 20-year period of occupation:				
People—number	20	35	45	50
Bison per village per year—number	3.0	1.8	0.95	3.4
Minimum meat requirement per village per year—pounds	3,650	6,387	8,212	9,125
Meat per year represented by the bone—pounds	1,500	940	475	1,700
4 people per house; 15-year period of occupation:				
People—number	16	28	36	40
Bison per village per year—number	3.9	2.4	1.27	4.53
Minimum meat requirement per village per year—pounds	2,920	5,110	5,570	7,300
Meat per year represented by the bone—pounds	1,950	1,200	635	2,265

A conservative estimate for the meat requirement is taken as one-half pound of lean meat, or equivalent, per person per day. For rapidly growing children, people doing hard physical labor, or under exposed weather conditions, the requirements are much higher. The amount of meat per bison is based on the results of modern butchering practices with prime beef, which shows that only very little over one-half of the live weight of a steer is usable meat. Thus a 1,000-pound bison would deliver only 500 pounds of usable meat with modern, efficient methods of butchering. With the tools and methods used by these people the usable amount of meat would be much less. An examination of table 2 makes it obvious that the amount of usable meat, as shown by the bison bone found in the site, is far below the

minimum requirement for survival. Where, then, did they get the additional concentrated proteins?

Group hunts, or bison kills, appear to have been a standard practice since the time of the earliest peoples (Folsom, Yuma, etc.). With the earth-lodge peoples the group hunts probably took place a considerable distance from the village in order to avoid the annoyance of wolves and bears—both of which have a voracious appetite for carrion. The odor of the remains of 50 or 60 bison would become very evident after a few days in the hot summer sun and would attract both wolves and bears for many miles. In order to avoid transporting excess weight a long distance it is conceivable that the meat was stripped from the skeleton and partly or wholly processed at the hunting camp. If this premise is acceptable we are then permitted to assume that the bone found in the site represents the bison killed locally or retrieved from the river.

An examination of table 1 shows a gradual increase in the number of scapula hoes. In the Monroe, Anderson, and Stanley Foci the sum of the worked and unworked scapulae is very little below the number of individuals represented by any other element, while in the Snake Butte Focus the sum of the worked and unworked scapulae (68) is nearly three times that of the distal end of the tibia (23). Thus, we have recorded from this site 45 bison which are represented by scapula hoes and no other element. The inference to be drawn is that the bison obtained locally were inadequate to supply the demand for agricultural and other implements and it was necessary to bring scapulae from the group hunt.

CONCLUSIONS

Because of the lack of this type of data for the time gap between the Anderson and Stanley Foci, a trend in butchering technique cannot be identified at this time. An examination of table 1 shows considerable difference in the frequency distribution of the various skeletal elements brought to the village by each focus. If the examination is narrowed to a comparison of the Monroe with the Anderson or the Stanley with the Snake Butte Focus, it is seen that the frequency distribution falls into the same overall pattern, but there are some rather wide differences which may have cultural significance, such as the parts of the skull in the Monroe and Anderson Foci. Consequently, there is reason to believe that with a sufficient number of such studies, placed in their proper chronological order, the results will be compatible with other cultural trends.

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APPENDIX 6

MAIZE FROM THE DODD AND PHILLIPS RANCH SITES[12]

By Norton H. Nickerson and Ding Hou

THE DODD SITE (39ST30)

The sample of maize from the Dodd site consisted of six charred cob fragments none of which was whole enough to establish the shape of the specimen. All specimens were from Stanley Focus Loci. The following measurements and observations were made; the values are in millimeters unless otherwise stated. For further explanation of these items, see Nickerson (1953).

Cupule width	9. 5
Cupule depth	. 25
8-rowed cobs (percent)	100. 0
Shank diameter (1 cob only)	18. 0
Height of rachis-flaps	1. 7
Kernel thickness	4. 0
Lower glume width	5. 6

These data indicate that from 1700 to 1750, the maize of the lower Oahe Reservoir was predominantly an Eastern type. Eastern influence (Carter and Anderson, 1945) is shown by wide cupules, a positive cupule depth, a high percentage of 8-rowed cobs, an indication of large shank diameters, high rachis-flaps, moderately thin kernels, and medium-wide lower glumes. That this sample is not entirely an Eastern maize, however, is evidenced by the fact that in each of the above-listed characters it is not at the extreme of each value that pure Eastern maize is. The maize is mixed with some other form or race. In view of its late age, the mixed-in race may be a form of Mexican maize. Mexican influence (Carter and Anderson, 1945) tends to lessen the extremes of each measurement of Eastern maize whenever the two are brought together. A Mexican influence may have been on the north Plains quite early. At Yampa Canyon, Colo., Burgh and Scoggin (1948) found maize of a definite Mexican character dating back to A. D. 400 which did not come up directly from the South. On the other hand, Mexican influence may have been quite late, having come in with the southeastern Mexican ceremonial complex (Waring and Holder, 1945). Whichever its source, Mexican influence in this maize sample has acted to reduce extremes of characters common in purely Eastern maize.

[12] This report was received while this bulletin was in press, and serves as an amplification of the data in Appendix 1, page 163.

THE PHILLIPS RANCH SITE (39ST14)

Forty-one cob fragments from the Phillips Ranch site were examined. The following measurements were made; values are in millimeters unless otherwise noted. For further explanation of these items, see Nickerson (1953).

Row number	8 10 12 14 16
	29 11 1
Cupule width	8.0
Cupule depth	0
8-rowed cobs (percent)	75.0
Shank diameter	11.4
Straight cobs (percent)	4.0
Height of rachis-flaps	1.3
Kernel thickness	3.4
Tapered cobs (percent)	33.0
Lower glume width	5.1

These data show that this maize is predominantly like Northeastern Flint (Brown and Anderson, 1947). It has a high percentage of 8-rowed cobs, thin kernels, wide cupules, medium-wide lower glumes, and medium-large shank diameters. The sample is not a pure race of Eastern maize, however. The presence of tapered cobs, a cupule depth of zero, and medium-high rachis-flaps indicate that this tempering of characters may have been brought about by mixture with a Mexican type maize (Carter and Anderson, 1945). The origin of this Mexican influence is not known with certainty. If the influence occurred on the Plains early, it may be allied to that found by Burgh and Scoggin (1948) at Yampa Canyon, Colo., dated A. D. 400. If it occurred late, the influence may have been introduced at the time of the Mexican ceremonial complex (Waring and Holder, 1945) in the Southeast and spread northward. Since the culture with which these remains are identified is definitely known to be late, the latter possibility seems more reasonable.

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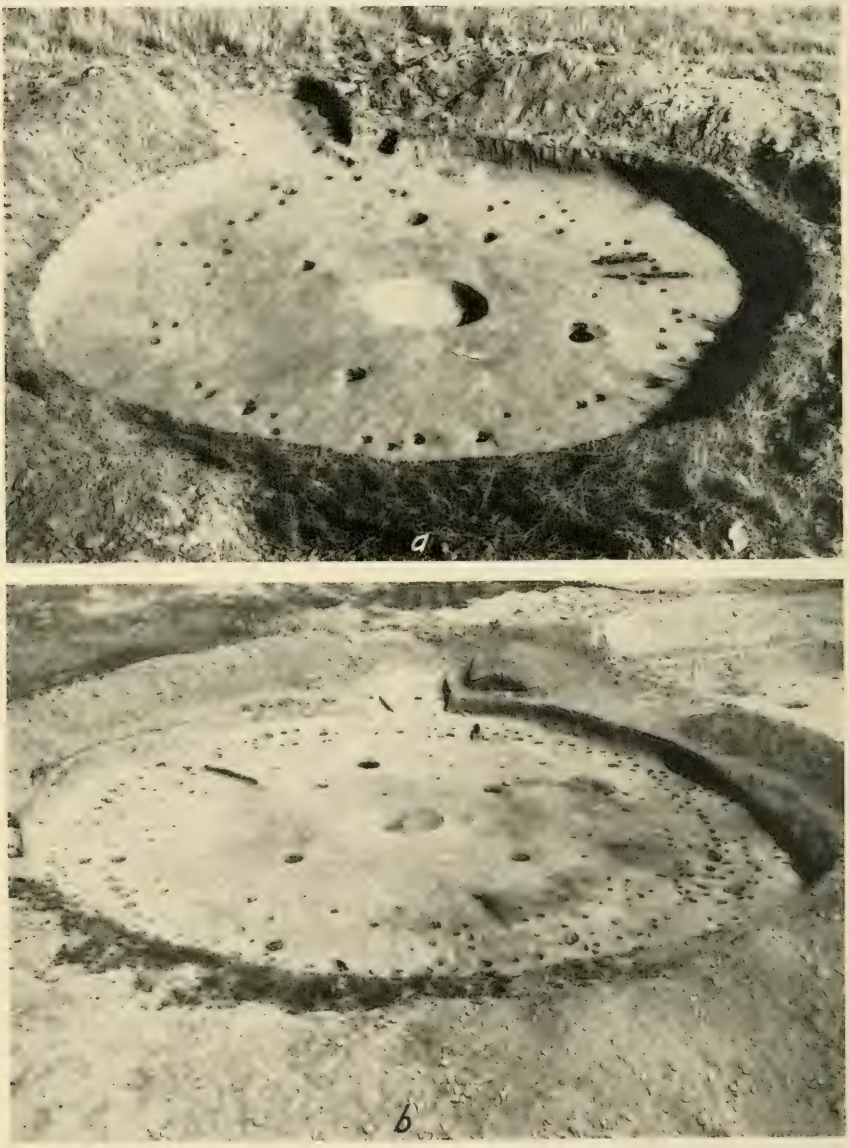
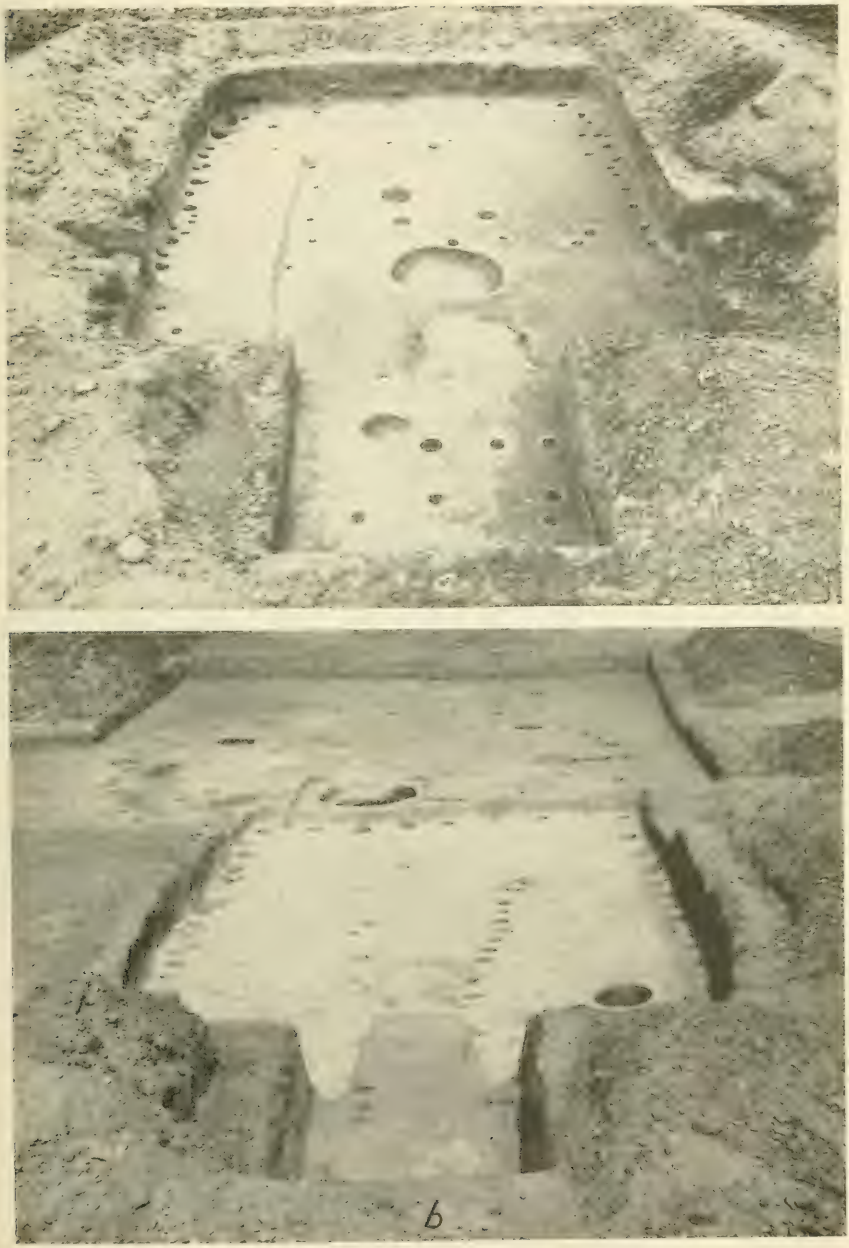
Aerial views of the Dodd site (*a*) before and (*b*) during excavation.



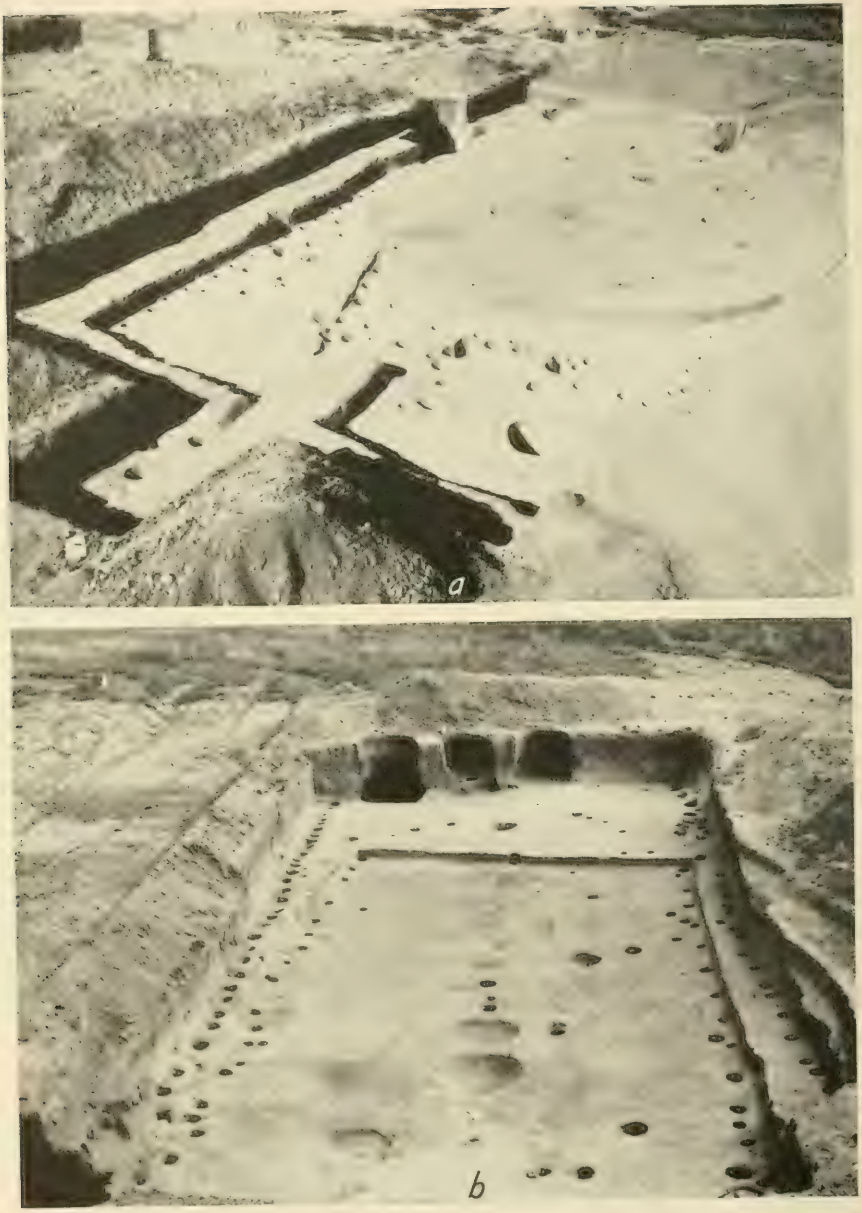
Circular houses at the Dodd site. *a*, Feature 106. *b*, Feature 15.

Circular houses at the Dodd site. *a*, Feature 35. *b*, Feature 25.

Rectangular houses at the Dodd site. *a*, Feature 34. *b*, Feature 76 underlying Feature 15.



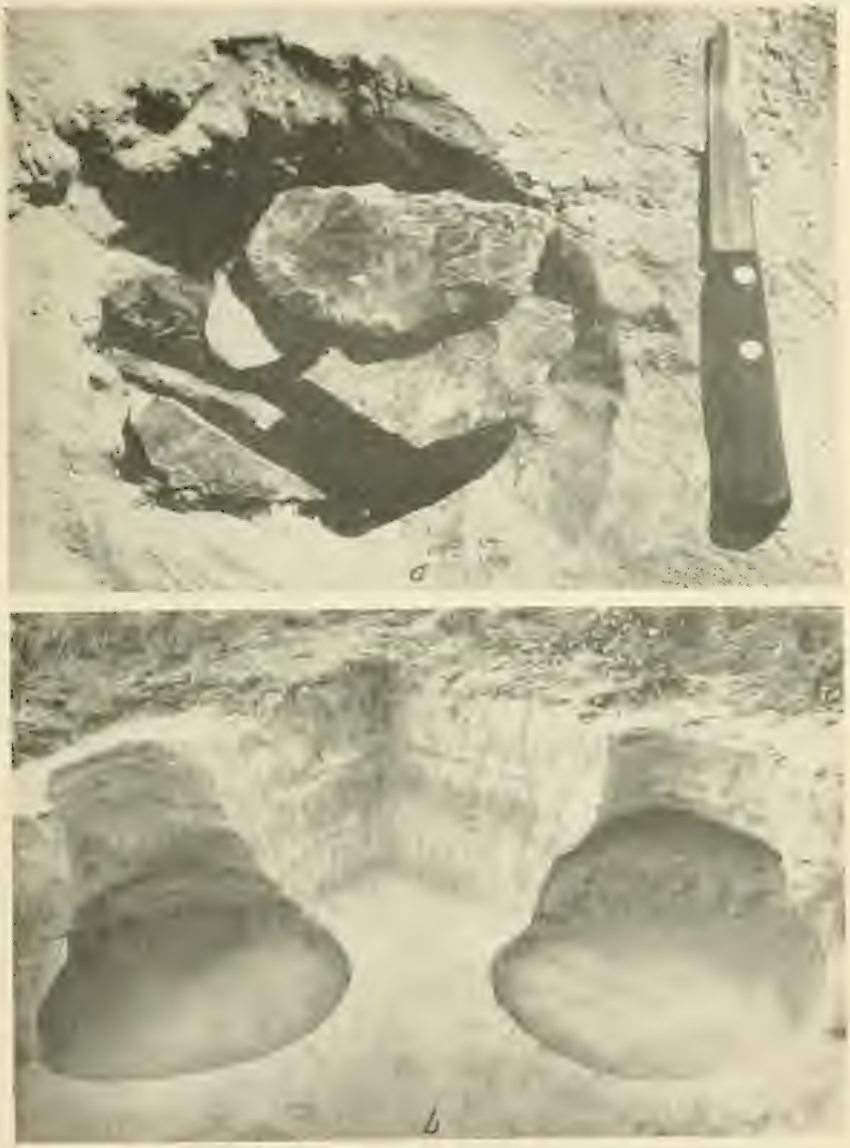
Rectangular houses at the Dodd site. *a*, Feature 61–62. *b*, Feature 41 with Feature 8 in background.



House superposition at the Dodd site. *a*, Feature 7 overlying Features 42 and 88. *b*, Features 5 and 29 with remnant of pit of Feature 1 at right.

Architectural details at the Dodd site. *a*, Entrance, circular house, Feature 15. *b*, Entrance, rectangular house, Feature 41. *c*, Altar, Feature 25.

a, Domestic "altar," Feature 8, Dodd site. *b*, Seal in cache pit showing included bison bones, Dodd site.

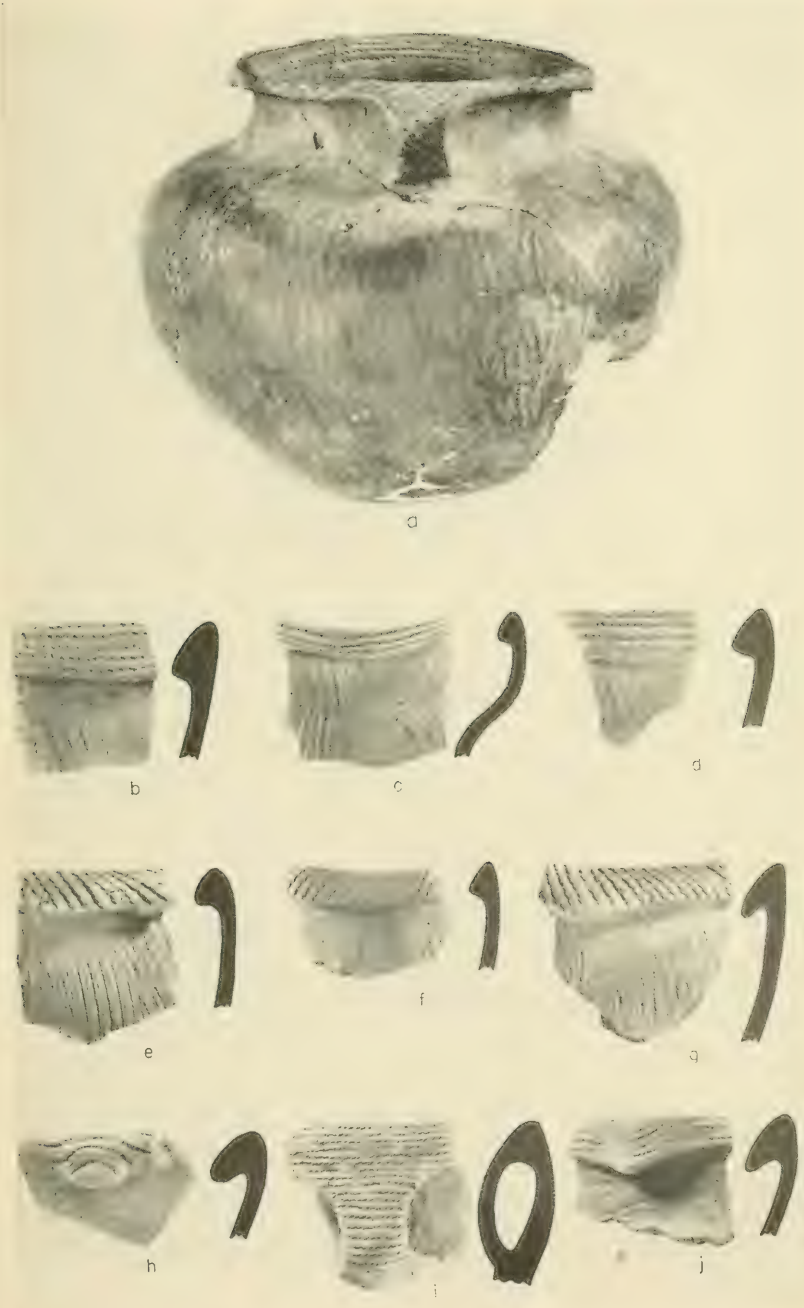


a, Pocket cache containing stone blanks. *b*, Undercut cache pits, Dodd site.

a, Burial 1, Dodd site. *b*, Burial 1, 39ST53.

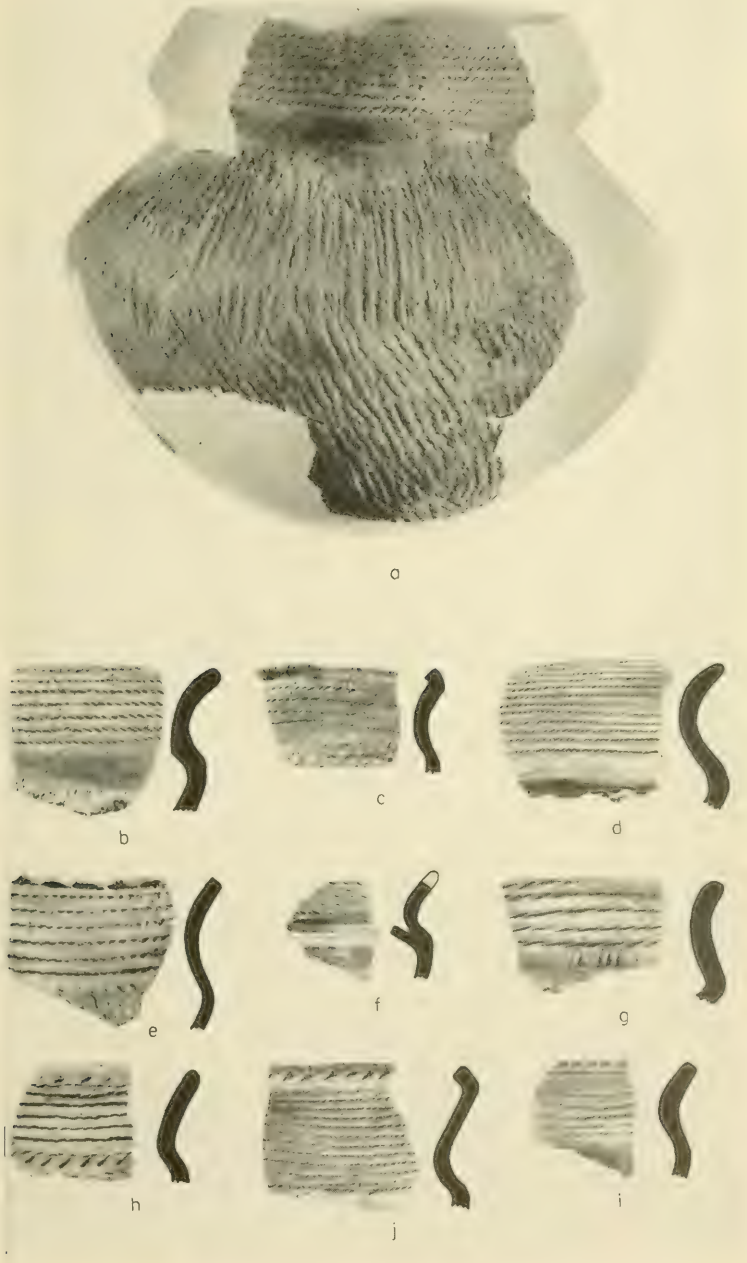
a, Burial 1. *b*, Burial 2, 39ST15.

a, Stanley Wavy Rim (vessel diameter: 255 mm.). *b–e*, *g*, Sherds. *f*, Talking Crow Brushed.

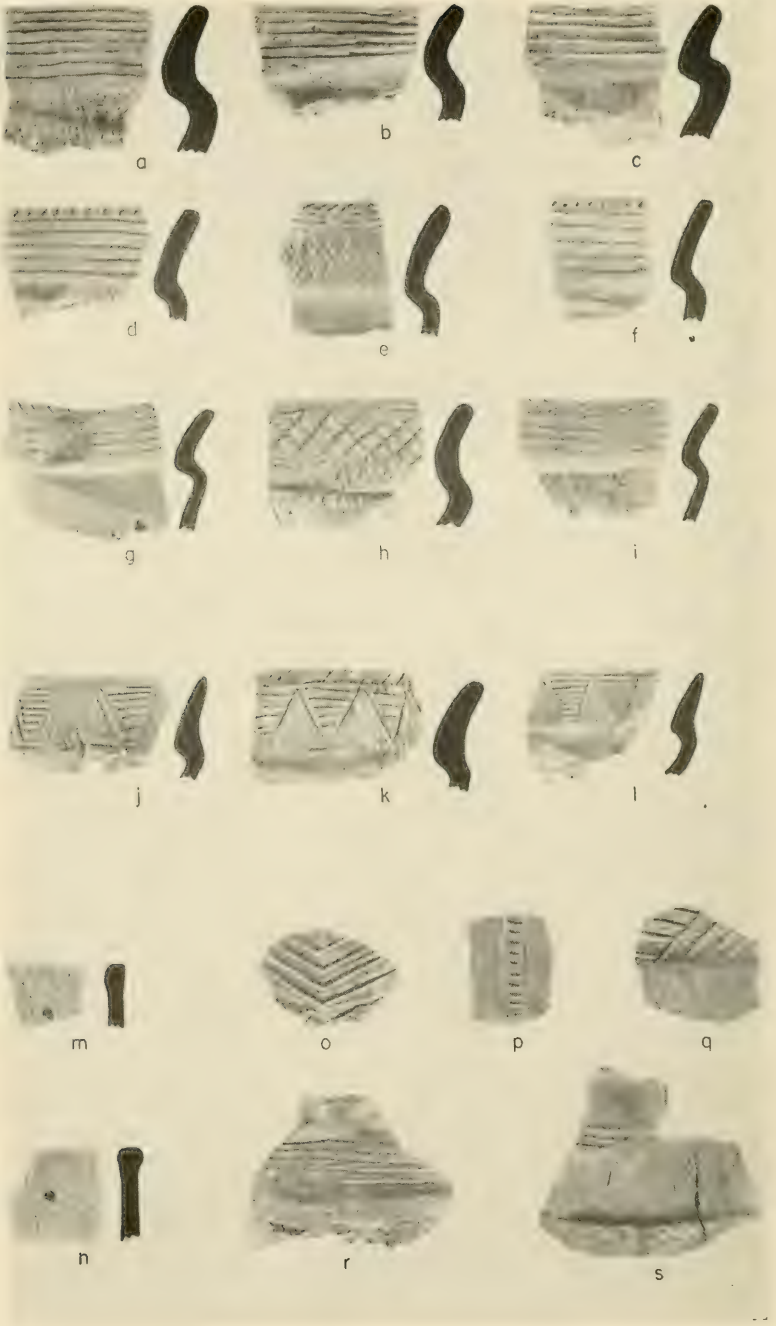


a, Stanley Cord Impressed (vessel diameter: 237 mm.). *b–j*, Sherds.

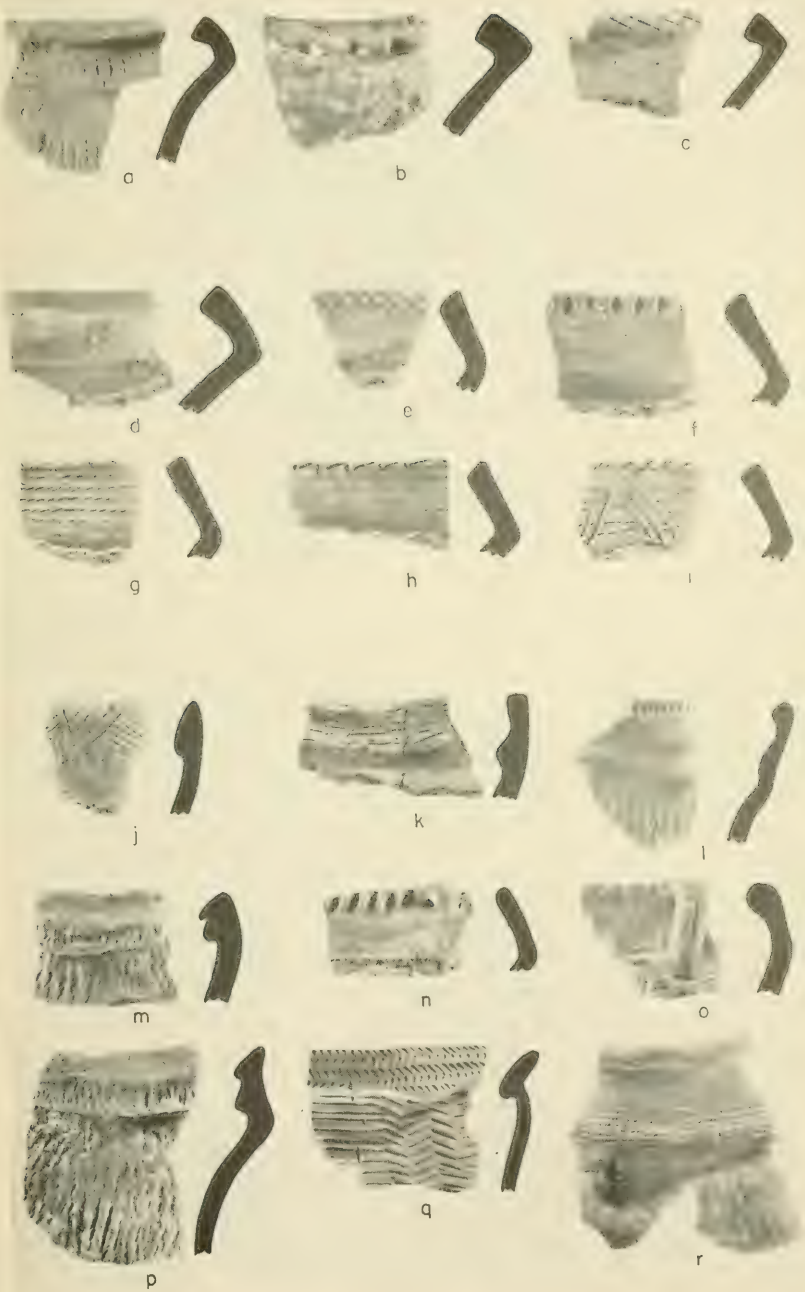
A, Stanley Tool Impressed (vessel diameter: 202 mm.). *a–i*, Sherds.



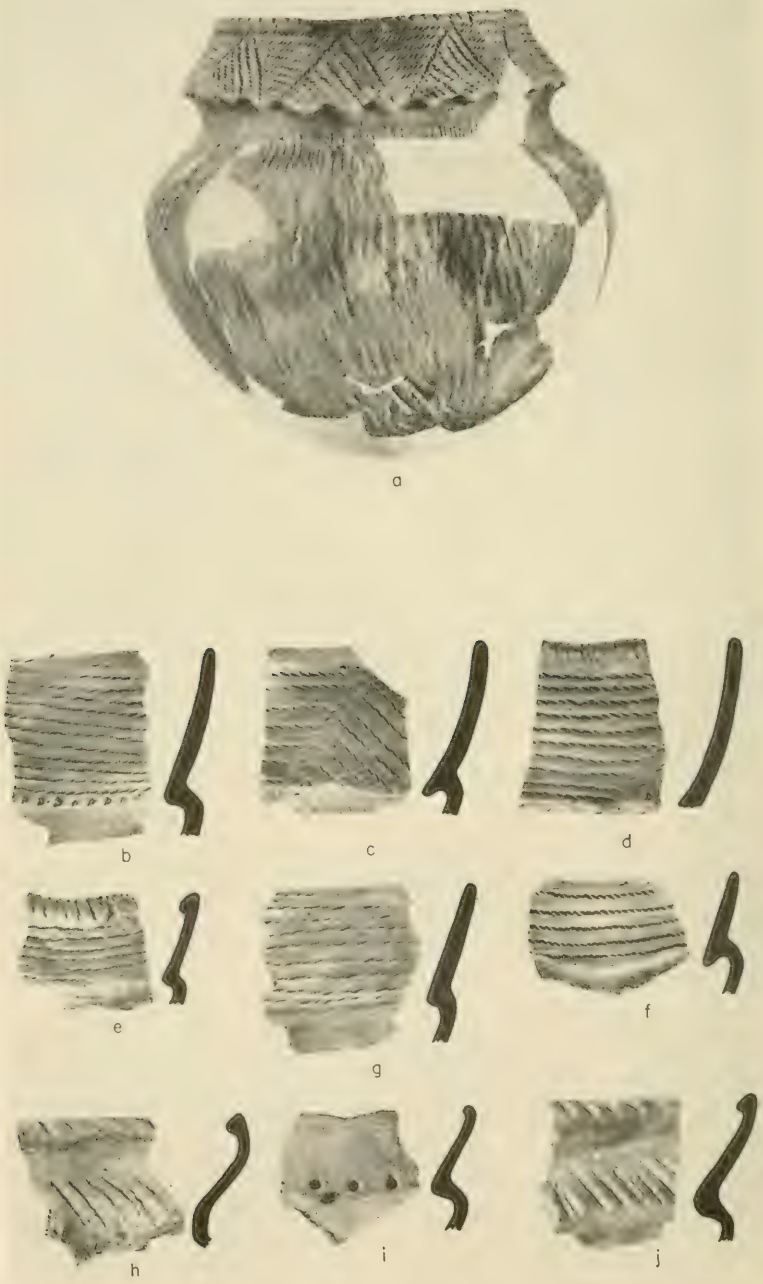
a, Foreman Cord Impressed (vessel diameter: 205 mm.). *b–j*, Sherds.



a-i, Foreman Incised; *j-l*, Monroe Collared Rim; *m*, *n*, Woodland; and *o-s*, broad-trailed sherds.

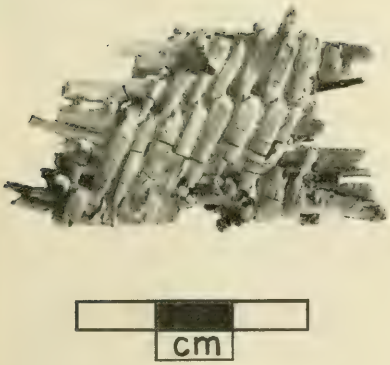


a–c, Anderson Low Rim. *d–i*, Anderson High Rim. *j–r*, Miscellaneous, Dodd site.



a, Colombe Collared Rim (vessel diameter: 195 mm.). *b–j*, Sherds.

a

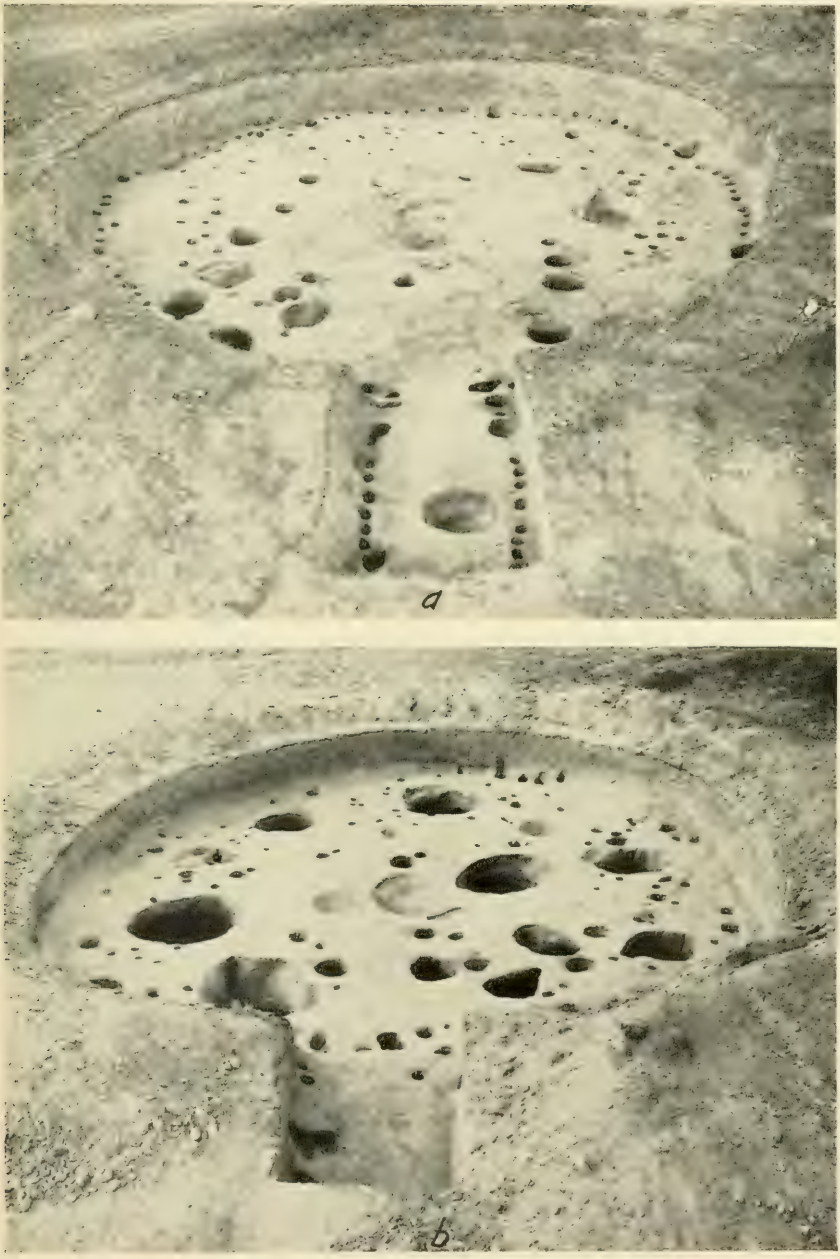


b

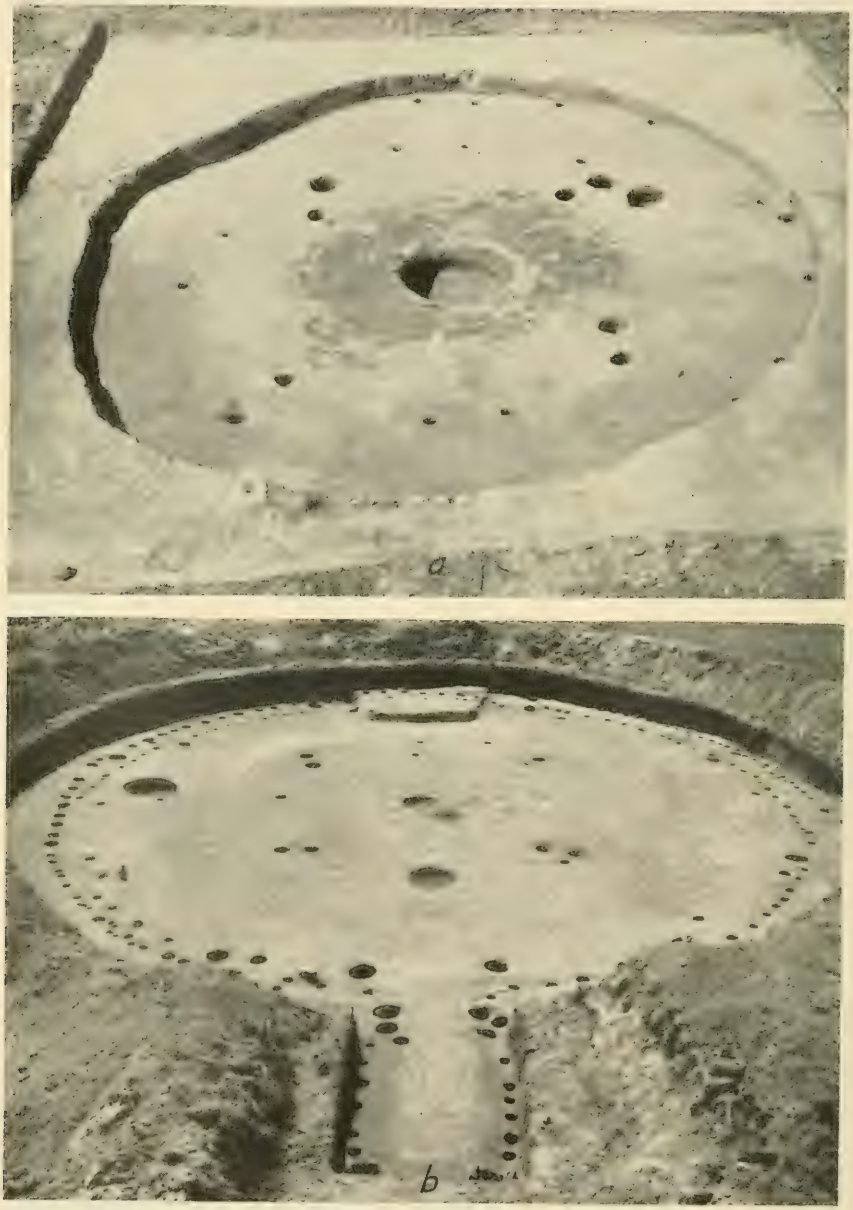
c

a, Mitchell Broad-Trailed vessel (note "weeping eye" below handle). *b*, Basketry, Phillips Ranch site. *c*, Basketry, Burial 1, 39ST15.

a, Aerial view of the Phillips Ranch site before excavation. *b*, Stripped area at the Phillips Ranch site.



a, Feature 3. *b*, Feature 5. Phillips Ranch site.



a, Feature 27. *b*, Feature 15. Phillips Ranch site.

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